

Journal of the Royal Society of Arts

NO. 5056

MARCH 1961

VOL. CIX

FORTHCOMING MEETINGS

WEDNESDAY, 1ST MARCH, at **2.30 p.m.** FIRST EDMUND RICH MEMORIAL LECTURE. '*Welfare and the English School*', by W. F. Houghton, M.A., Education Officer, London County Council. Sir Griffith Williams, K.B.E., C.B., in the Chair.

MONDAY, 6TH MARCH, at **6 p.m.** The first of three CANTOR LECTURES on '*Modern Photography*', entitled 'Photography in Industry and Commerce', by M. J. Langford, F.I.B.P., F.R.P.S. Peter A. Le Neve Foster, a Member of Council of the Society, in the Chair. (The Lecture will be illustrated with lantern slides.)

TUESDAY, 7TH MARCH, at **5.15 p.m.** COMMONWEALTH SECTION. '*Sovereign Nigeria*', by Sir John Macpherson, G.C.M.G., formerly Governor-General, Federation of Nigeria. The Right Honble. Viscount Boyd of Merton, P.C., C.H., Chairman of Council, Royal Commonwealth Society, in the Chair. (Tea will be served in the Library from 4.30 p.m.)

WEDNESDAY, 8TH MARCH, at **6 p.m.** '*Technical Developments in the Steel Industry*', by Sir Andrew McCance, D.L., D.Sc., LL.D., F.R.S., Chairman and Managing Director, Colvilles Ltd. The Honble. G. C. H. Chubb, Managing Director, Chubb & Son's Lock & Safe Co. Ltd., and a Member of Council of the Society, in the Chair. (The first of two papers—see also 22nd March.)

FRIDAY, 10TH MARCH, at **7.30 p.m.** FILM EVENING. (See programme on p. 242.)

MONDAY, 13TH MARCH, at **6 p.m.** The second of three CANTOR LECTURES on '*Modern Photography*', entitled 'Photography in Medicine', by C. E. Engel, F.I.B.P., F.R.P.S., of the Department of Medical Illustration, Guy's Hospital Medical School. Sir Charles Dodds, M.V.O., M.D., D.Sc., Ph.D., F.R.C.P., F.R.S., Courtauld Professor of Biochemistry, University of London, in the Chair. (The Lecture will be illustrated with lantern slides.)

WEDNESDAY, 15TH MARCH, at **2.30 p.m.** '*Some Folk Lore and History of Diamond*', by S. Tolansky, D.Sc., Ph.D., D.I.C., F.R.S., Professor of Physics, Royal Holloway College (University of London), and a Member of Council of the Society. Elkan Simons, Chairman of the Design and Research Centre for the Gold, Silver and Jewellery Industries, in the Chair.

MONDAY, 20TH MARCH, at 6 p.m. The last of three CANTOR LECTURES on 'Modern Photography', entitled 'Photography in Education', by Miss Margaret F. Harker, F.I.B.P., F.R.P.S., Head of the School of Photography, Regent Street Polytechnic. Hugh A. Warren, M.Sc.(Eng.), M.I.C.E., M.I.Struct.E., Principal, South-East London Technical College, and Member of Council of the Society, in the Chair. (The Lecture will be illustrated with lantern slides.)

WEDNESDAY, 22ND MARCH, at 6 p.m. 'Economic and Commercial Aspects of the Steel Industry', by Sir Robert Shone, C.B.E., Executive Member, Iron and Steel Board. The Right Honble. Lord Mills, K.B.E., Paymaster-General, in the Chair. (See also 8th March.)

THURSDAY, 13TH APRIL, at 5.15 p.m. COMMONWEALTH SECTION. SIR THOMAS HOLLAND MEMORIAL LECTURE. 'The Commonwealth Association in Theory and Practice', by J. D. Bruce Miller, M.Sc., Professor of Politics, University of Leicester. K. B. Smellie, Professor of Political Science, London School of Economics and Political Science, in the Chair. (Tea will be served in the Library from 4.30 p.m.)

WEDNESDAY, 19TH APRIL, at 6 p.m. FERNHURST LECTURE. 'Scientific Methods of Animal Feeding', by K. L. Blaxter, D.Sc., Ph.D., B.Sc.(Agric.), N.D.A., of the Hannah Research Institute. The Right Honble. Lord Netherthorpe, a Member of Council of the Society and formerly President of the National Farmer's Union, in the Chair.

Fellows are entitled to attend any of the Society's meetings without tickets (except where otherwise stated), and may also bring two guests. When they cannot accompany their guests, Fellows may give them special passes, books of which can be obtained on application to the Secretary.

Official representatives of Companies in association with the Society may also attend, with one guest.

FILM EVENING

The last Film Evening of the Session will be held at the Society's House on Friday, 10th March, at 7.30 p.m., when the following films will be screened:

An Artist Looks at Churches
Grantchester
Stone into Steel
Malayan Seashore

An Artist Looks at Churches (15 minutes) is a colour film produced by British Transport Films. Out of the 20,000 churches in Britain, an artist (John Piper) selects one from each century from Norman times to the present day, drawing attention to the richness of its architecture, decoration, carving, sculpture or stained glass. (To be introduced by Mr. Edgar Anstey.)

Grantchester (15 minutes), also in colour, was produced by Mr. John R. F. Stewart, and is a visual interpretation of Rupert Brooke's poem, 'Grantchester'. Mr. Stewart will introduce his film.

Stone into Steel (37 minutes) was produced by Wallace Productions for the United Steel Companies. Apart from a rather long opening caption, giving an outline of steelmaking, there is neither commentary nor dialogue, but with the aid of some outstanding cinematography and an effective musical score, the film describes the story of the making of steel from the original iron ore up to the finished product. This film gained the Golden Mercury award at Venice in 1960. It will be introduced by its Producer, Mr. John Bundy.

Malayan Seashore (10 minutes), produced by the Malayan Film Unit, is a brief record of the various kinds of life that inhabit the Malayan seashore.

Tickets of admission are not required for this occasion and Fellows are entitled to introduce two guests. Light refreshments will be served in the Library after the performance.

SECOND ANNUAL RECEPTION

As fully announced in the last issue of the *Journal*, the Second Annual Reception will be held at the Society's House on the evening of Friday, 3rd March, when the Guest of Honour will be the President of the Royal Society, Sir Howard Florey. Amongst the other distinguished guests will be the Lord Mayor of London and the Lady Mayoress.

The evening's entertainment will include two recitals by Mr. John Barstow (a young pianist who is just beginning his concert career), a film show and an exhibition of work designed by past winners of awards in the Society's annual industrial art bursaries competitions.

It is possible that by the time this *Journal* is distributed some tickets for the Reception will still be available. The price of a single ticket is 30s., including the cost of all refreshments and wines throughout the evening, and Fellows may each apply for up to two tickets.

THE ALBERT MEDAL

The Council are considering the award of the Albert Medal of the Royal Society of Arts for 1961. They therefore invite Fellows of the Society to forward to the Secretary as soon as possible the names of such men and women of high distinction as they think worthy of this honour. The Medal was struck to reward 'distinguished merit in promoting Arts, Manufactures and Commerce', and has been awarded in previous years as follows:

1864	Sir Rowland Hill	1867	Sir W. Fothergill Cooke and Sir Charles Wheatstone
1865	HIS IMPERIAL MAJESTY THE EMPEROR NAPOLEON III	1868	Sir Joseph Whitworth
1866	Michael Faraday	1869	Baron Justus von Liebig

- 1870 Vicomte Ferdinand de Lesseps
 1871 Sir Henry Cole
 1872 Sir Henry Bessemer
 1873 Michael Eugène Chevreul
 1874 Sir C. W. Siemens
 1875 Michel Chevalier
 1876 Sir George B. Airy
 1877 Jean Baptiste Dumas
 1878 Sir Wm. G. (afterwards Lord) Armstrong
 1879 Sir William Thompson (afterwards Lord Kelvin)
 1880 James Prescott Joule
 1881 Professor August Wilhelm Hofmann
 1882 Louis Pasteur
 1883 Sir Joseph Dalton Hooker
 1884 Captain James Buchanan Eads
 1885 Sir Henry Doulton
 1886 Samuel Cunliffe Lister (afterwards Lord Masham)
 1887 HER MAJESTY QUEEN VICTORIA
 1888 Professor Hermann Louis Helmholtz
 1889 John Percy
 1890 Sir William Henry Perkin
 1891 Sir Frederick Abel, Bt.
 1892 Thomas Alva Edison
 1893 Sir John Bennett Lawes, Bt., and Sir Henry Gilbert
 1894 Sir Joseph (afterwards Lord) Lister
 1895 Sir Isaac Lowthian Bell, Bt.
 1896 Professor David Edward Hughes
 1897 George James Simons
 1898 Professor Robert Wilhelm Bunsen
 1899 Sir William Crookes
 1900 Henry Wilde
 1901 HIS MAJESTY KING EDWARD VII
 1902 Professor Alexander Graham Bell
 1903 Sir Charles Augustus Hartley
 1904 Walter Crane
 1905 Lord Rayleigh
 1906 Sir Joseph Wilson Swan
 1907 The Earl of Cromer
 1908 Sir James Dewar
 1909 Sir Andrew Noble
 1910 Madame Curie
 1911 The Honble. Sir Charles Algernon Parsons
 1912 Lord Strathcona and Mount Royal
 1913 HIS MAJESTY KING GEORGE V
 1914 Senatore (afterwards Marchese) Guglielmo Marconi
 1915 Sir Joseph John Thomson
 1916 Professor Elias Metchnikoff
 1917 Orville Wright
 1918 Sir Richard Tetley Glazebrook
 1919 Sir Oliver Joseph Lodge
 1920 Professor Albert Abraham Michelson
 1921 Sir J. Ambrose Fleming
 1922 Sir Dugald Clerk
 1923 Major-General Sir David Bruce and Colonel Sir Ronald Ross
 1924 H.R.H. THE PRINCE OF WALES
 1925 Lieut.-Colonel Sir David Prain
 1926 Professor Paul Sabatier
 1927 Sir Aston Webb
 1928 Sir Ernest (afterwards Lord) Rutherford
 1929 Sir J. Alfred Ewing.
 1930 Professor Henry E. Armstrong
 1931 H.R.H. THE DUKE OF CONNAUGHT AND STRATHEARN
 1932 Frank (afterwards Sir Frank) Brangwyn
 1933 Sir William Llewellyn
 1934 Sir Frederick Gowland Hopkins
 1935 Sir Robert A. Hadfield, Bt.
 1936 The Earl of Derby
 1937 Lord (now Viscount) Nuffield
 1938 HER MAJESTY QUEEN MARY
 1939 Sir Thomas H. Holland
 1940 John A. Milne
 1941 President Franklin D. Roosevelt
 1942 Field-Marshal J. C. Smuts
 1943 Sir John Russell
 1944 Sir Henry Tizard
 1945 Winston (now Sir Winston) Churchill
 1946 Sir Alexander Fleming and Sir Howard Florey
 1947 Sir Robert Robinson
 1948 Sir William Reid Dick
 1949 Sir Giles Gilbert Scott
 1950 Sir Edward Appleton
 1951 HIS MAJESTY KING GEORGE VI
 1952 Sir Frank Whittle
 1953 Dr. E. D. (now Lord) Adrian
 1954 Sir Ambrose Heal
 1955 Dr. Vaughan Williams
 1956 Sir Henry Dale
 1957 Sir Christopher Hinton
 1958 HER MAJESTY QUEEN ELIZABETH II
 1959 Vincent Massey
 1960 Sir Frederick Handley Page

REGIONAL ACTIVITIES OF THE SOCIETY

BIRMINGHAM

After the dinner held at Birmingham last May (see *Journal*, June, 1960, page 473), a small exploratory Committee under the chairmanship of the Very Reverend Michael Clarke, Provost of Birmingham, organized a second dinner to which all Fellows living in the Midlands were invited. At that meeting a Committee, with Mr. T. Emerson as Chairman, was appointed to arrange a programme of activities for 1961.

MANCHESTER

As foretold in the *Journal* for January, 1961 (page 74), a dinner was held at the Midland Hotel, Manchester, on 24th January. Mr. Peter Le Neve Foster, acting for the Chairman of Council, and accompanied by Mr. Hugh A. Warren, the Secretary and the Deputy Secretary, met 104 Fellows to discuss the desirability of starting local activities in the north-western area of the country. It was clear that those present were unanimously in favour of this proposal, and various useful suggestions were made as to ways in which such activities might be organized. An exploratory committee of Fellows living in the area is now being set up to make specific recommendations for consideration by the Council.

MEETING OF COUNCIL

A meeting of Council was held on Monday, 13th February. Present: Dr. R. W. Holland (in the Chair); Mrs. Mary Adams; Sir Hilary Blood; Lord Bossom; Lord Conesford; Mr. R. E. Dangerfield; Sir George Edwards; Mr. E. Maxwell Fry; Mr. John Gloag; Mr. Milner Gray; Professor R. Y. Goodden; Dr. Stanley Gooding; Mr. Antony Hopkins; Sir Harry Lindsay; Lord Nathan; the Earl of Radnor; Mr. Paul Reilly; Sir Gilbert Rennie; Mr. A. R. N. Roberts; Professor S. Tolansky; Mr. G. E. Tonge; Mr. C. E. Vignoles, and Mr. Hugh A. Warren; with Mr. G. E. Mercer (Deputy Secretary), and Mr. J. S. Skidmore (Assistant Secretary).

ELECTIONS

The following candidates were duly elected Fellows of the Society:

Barratt, Clifford Lincoln Whitfield, G.R.S.M., L.R.A.M., A.R.C.M., London.
Barry, John Arthur, Watford, Herts.

Brown, Frederick Herbert Stanley, C.B.E., B.Sc., M.I.Mech.E., M.I.E.E., London.

Brown, Mrs. Pauline Maire, Ashington, Northumberland.

Brown, William George, M.S.I.A., Ashted, Surrey.

Burgess, Cecil Gurney, L.R.I.B.A., London.

Burleigh, Marshall, North Shields, Northumberland.

- Butler, Norman, St. Anne's-on-Sea, Lancs.
 Calman, Mrs. Montague (Miss Deecie C. Lyall), G.R.S.M., L.R.A.M., London.
 Cockerell, Christopher Sydney, M.A., Lowestoft, Suffolk.
 Creer, Victor, M.A., Englefield Green, Surrey.
 Diprose, Donald Brian, Maidstone, Kent.
 Drummond, Alexander Smart, Dundee.
 Dumont-Smith, Robert, East Croydon, Surrey.
 Edwards, Edward Ralph, West Hartlepool, Co. Durham.
 Farrar, Victor John Frederick, Great Barford, Beds.
 Faulkner, Percy, C.B., LL.B., Northwood, Middx.
 Field, Jonathan, Horley, Surrey.
 Gordon, William Lindsay, M.A., B.M., Birmingham.
 Graham, Anthony, Daventry, Northants.
 Harvey, Cecil Owen, B.Sc., A.R.C.S., F.R.I.C., London.
 Haughton, Wilfred James, Ballymena, Co. Antrim, Northern Ireland.
 Hayes, William J., Cork, Eire.
 Hedges, LeRoy Ellis, D.D.S., Chicago, Illinois, U.S.A.
 Hull, Gordon Frank, Southwell, Notts.
 Jackman, Henry Rutherford, Q.C., Toronto, Canada.
 Johnson, Peter, Sydney, N.S.W., Australia.
 Leong, Yap Chai, Klang, Selangor, Federation of Malaya.
 Lewis, Christopher Brian, Bath.
 Lock, Mrs. Clara Beatrice Muriel, B.A., Ph.D., A.L.A., Birmingham.
 Luckas, John Richard Ainley, M.B., Ch.B.
 McMorrin, Harold John Stuart, Worthing, Sussex.
 Masfield, Peter Gordon, M.A., F.R.Ae.S., London.
 Mason, Mrs. Florence, Johannesburg, South Africa.
 Mathews, Alfred Lawrence James, Wallington, Surrey.
 Monro, Miss Helen (Mrs. W. E. S. Turner), M.A., D.A., Juniper Green, Midlothian.
 Morris, Sir Philip Robert, K.C.M.G., C.B.E., M.A., Hon.L.L.D., Bristol.
 Morrison, Trevor Gordon Lamont, Strathaven, Lanarkshire.
 Nichol, John Lang, Vancouver, Canada.
 Nielsen, Carl, London.
 Paine, Clifford, B.Sc., F.R.I.C., Farnham Common, Bucks.
 Pancholy, Professor Bhanoo, Sayajiganj, Baroda, India.
 Rose, Geoffrey Thomas, London.
 Russell, Major-General George Neville, C.B., C.B.E., London.
 Seaman, Robert Cleveland, Norwood, Mass., U.S.A.
 Seljouk, Mehdi Ali, M.A., LL.B., Karachi, Pakistan.
 Swarbrick, John, F.R.I.B.A., F.S.A., Cheam, Surrey.
 White, Dennis Roy, West Coker, Somerset.
 Williams, Albert, Brighton, Sussex.
 Wilson, Alexander Thomson Macbeth, M.D., B.Sc., Ch.B., London.

The following Companies were duly admitted into association with the Society:

- Josiah Parkes & Sons Ltd., Staffs.
 Rank Precision Industries Ltd., London.
 Rowntree & Co. Ltd., York.
 Savory & Moore Ltd., London.

INDUSTRIAL ART BURSARIES COMPETITION

The recommendations made by the Industrial Art Bursaries Board in respect

MARCH 1961

JOURNAL OF THE ROYAL SOCIETY OF ARTS

of the Competition held in 1960, and of the arrangements for a Competition in 1961, were adopted.

COMMONWEALTH TECHNICAL TRAINING WEEK

It was reported that the Society had been invited to nominate a number of representatives to attend the Service which would be held in St. Paul's Cathedral on 1st June, 1961.

REGIONAL ACTIVITIES

Approval was given to the appointment of a local Committee to consider regional activities of the Society in the north-western area of the country.

ANY OTHER BUSINESS

A quantity of financial and other business was transacted.

THE FUNCTION OF LABOUR AND THE TRADE UNIONS IN INDUSTRY AND COMMERCE

A paper by

W. J. CARRON,

*President, Amalgamated Engineering Union, read to
the Society on Wednesday, 14th December, 1960,
with The Viscount Knollys, G.C.M.G., M.B.E.,
D.F.C., Chairman, Vickers Ltd., in the Chair*

THE CHAIRMAN: I am delighted to take the Chair this evening, because it is in itself a great honour to be asked, and also because I am pleased to be able to introduce my friend, Mr. Carron. His life and career and the outstanding position in the trade union world that he has achieved, are known to you all. As to his personal characteristics and hobbies, I know he is a very keen and efficient photographer, and if he has a candid camera I must say that I should enjoy a post-script to his talk to-day in which he could give us on the screen here some candid camera shots of colleagues of mine in the engineering employers' world when they are sitting opposite to him and registering the effect of some of the blistering replies which he makes when certain negotiations take place!

I have sat by and met Mr. Carron in a variety of places and in a variety of rôles. I have sat opposite to him in various discussions up at York. I have sat round a table with him as a co-trustee of a very noteworthy new college, Churchill College, Cambridge. And now I am glad to find myself sitting alongside him in front of the audience here. I can say with assurance that he has a complete knowledge of his subject, a manner which elsewhere can make even the most unacceptable conditions almost acceptable, and therefore I know of nobody who would be able to deal better with the subject before us than Mr. Carron, whom I now introduce to you.

The following paper was then read.

THE PAPER

A custom and practice I adopt is to approach my subject matter with a primary analysis of the terms of reference. Such a course I believe to be advisable in this instance. Labour is not always identifiable with trade unions although, speaking conversely, the trade union is utterly dependent upon labour for its existence.

Labour came into this world at a very early date, we are told. The Book of Genesis states that 'with labour and toil shalt thou eat' and, following closely, 'In the sweat of thy face shalt thou eat bread'. In spite of this unfortunate state of affairs, which seems to suggest a previous and possible alternative, I am unable to visualize any system of civilized society without labour as a basic fundamental.

Skipping the intervening few thousand years, we find the same problem with us yet and—if I might stress this point—more urgently present than ever before.

We either produce or we starve. Lacking self-sufficiency, we in Britain must import to the extent of our immediate needs and, in order to do so, we must first export the proceeds of productivity. Production, broken down into factors, yields Land, Capital, Organization and Labour, thus returning to the point at which we commenced.

The function of labour in industry and commerce, therefore, is self-evident. Industry and commerce are the direct results of applied labour and, having said that, there is little more I am able to add unless we would resolve this meeting into a session on elementary economics.

At this juncture, I can well imagine some of my audience forecasting that, if I get rid of the other half of the terms of reference with the same speed as the first, they will be on their way home in something less than five minutes from now. I do not think, however, that this second half will be so easily shed.

There is a peculiarity in the mental approach, by the general public, to trade unionism. Almost invariably, the mention of the term starts thought processes moving in the general direction of industrial or agricultural workpeople bound together in combination. Why this should be so is difficult to appreciate. On the other hand, it is acceptable, as a contributory cause of such a misapprehension, that publicity in our daily newspapers is quick to give undue prominence to the organizations of workpeople, especially where such prominence brings out the subject matter in an unfavourable light.

Let us, therefore, examine the trade union, and to do so I would refer to the fifth edition of *Trade Union Law* compiled by Harry Samuels, M.A.:

A trade union is any combination (whether temporary or permanent) whose principal objects under its constitution are either one or more of the following (called 'Statutory Objects')—

- (a) To regulate the relations (i) between workmen and masters or (ii) between workmen or (iii) between masters;
- (b) To impose restrictive conditions on the conduct of any trade or business;
- (c) To provide benefits for members.

It is clear that this definition brings under the term 'trade union' not only trade unions in their ordinary or everyday meaning, that is, unions of workmen, but also employers' federations (or unions of employers), since one of the principal objects of the latter is to regulate the relations between masters. Trade union legislation therefore applies to the Employers' Federations equally as it does to what are ordinarily called trade unions, and throughout this book the term 'trade union' embraces bodies of either class. It also includes a branch.

One could, of course, give honourable mention to such organizations as the Law Society and the British Medical Association.

Naturally, I fully realize that my position here to-day relates to those trade unions normally and loosely identified as trade unions of workpeople. Nevertheless, bearing in mind the wide nature of the term itself, I should enter a caveat that my remarks must be taken in this context and, in many instances, cannot be applied to those other trade unions that I am neither qualified nor empowered to represent.

The trade union is not new, neither, by any means whatsoever, is it even medieval. The stone masons had achieved a very high order of organization considerably

before the time in which Solomon built his temple and, if popular theory is correct, Solomon had much to do with the consolidation of that Society. Where history is recorded, we find Anti-Combination Acts occurring periodically within its pages and the United Kingdom is no exception, for one finds Anti-Combination Acts following the Statute of Labourers in the fourteenth century and as late as the nineteenth century.

Economic pressures are the main and basic causes of combination—either between employers or between workpeople—and the strategy of combination is directed towards the preservation of the rights to practise the skills of crafts and professions for those who properly identify themselves with those crafts or professions. The betterment or preservation of remuneration and conditions of employment are generally included as a purpose of the combination.

I suppose it would be true to say that these principles have remained unaltered since workpeople first learned that there is strength in unity and combination. On the other hand, industry and commerce have been subjected to the whims of evolution and, although the day-to-day operation of each has undergone vast changes, the fundamentals of industrial endeavour and commercial enterprise have remained unaltered. Both workpeople in modern combinations and industry and commerce have this much in common, however, their horizons have broadened and their manifold commitments present a vast panorama of challenge which bears little or no comparison with the conditions in which our ancestors attempted to give effect to advanced or progressive thinking.

Modern expression of trade union policy can be contained in three short phrases:

- (1) hours of labour commensurate with increasing scientific and technological advance;
- (2) conditions of employment compatible with human dignity;
- (3) wages sufficient to ensure a fair participation in the proceeds of human productivity.

On these three principles, therefore, trade union hopes, ambitions and philosophy are based, none of it new but all of it stemming from roots penetrating into the dimmer stratum of obscure antiquity. In essence, the establishment of these three principles represents a major part of the function of organized labour within the trade unions in modern industry and commerce.

The fact that I am able, in 1960, to state that such is only *part* of trade union function is indicative of the vast changes in industrial relationships that have come into being since the darker years of the Second World War. Prior to this international setback to human progress, the trade unions had not been considered nor considered themselves as an integral part of industrial or commercial structure. In point of fact, quite the opposite was the general feeling—the pre-war owners of industry and commerce continually impressing the unions with the awful majesty of 'managerial function' and all that it represented. As a direct consequence, the unions came to accept that their prime and proper function was to despoil the Philistine at any and every available opportunity.

A further and greater evil to emerge from such mistaken philosophy was the normal approach, by workpeople, to national productivity. The idea of improving

and increasing production was completely unacceptable to trade union thought, for—in the face of an unbroken history connected with 'hire and fire' and consequential redundancy or prolonged unemployment—the principle operated, wherever possible, was to spread one day's work into two or even three days as a normally accepted trade union counter-measure.

The threat of total extinction by the Nazi forces brought about at least one beneficial change—it swept away, almost overnight, the major proportions of internal opposition between owner and employee in our industries and agricultural enterprises. Those ancient words that I used in opening this Paper took to themselves an entirely new meaning: not only were they conditional to the eating of bread but only in the sweat of our faces were we able to preserve our freedom and our way of life.

For the first time in history, therefore, trade union leadership was credited with the *attributes* of leadership. The trade union organization, with its junction of co-ordinating forces in the Trades Union Congress, was afforded recognition as something other than a disorderly rabble, and a high proportion of its members and officials at all levels was incorporated into those many and urgently necessary posts, committees and panels which had to be created during those hard years. Continuing into the post-war years, the Anglo-American Council on Productivity was but one manifestation of this changed order and, as could be reasonably expected, the Trades Union Congress, fully cognizant of its responsibility, provided its proportion of members to the British Productivity Council, on which I have the honour to serve as a Director and as Chairman for the current year.

From the foregoing, therefore, it is apparent that the establishment of those three trade union principles can only form a part of trade union function in industry and commerce. Maintenance of the necessary levels of national productivity is a problem which, in these times, devolves equally upon employers and trade unions because the consequences of failure to do so would eventually result in the destruction of both of us. Without productivity there will be neither trade unions nor industry and commerce.

A major difficulty which faces the trade unions to-day is to be able to convince our memberships of the grim urgency of the post-war requirements in national productivity and, at the same time, to be able to convince them that relationship between owner and employee has become entirely re-orientated. Continued changes in governmental economic and financial policies render this task ever more difficult because, in the face of created pockets of unemployment directly traceable to the restricted use of manufacturing capacity resulting from such policies, workpeople are becoming more and more prone to throw the whole issue back into the faces of their leaders. They, quite justifiably, ask whether productivity is something in aid of a sectional interest or whether it is truly in the interests of all of the people.

Redundancy is the anathema of trade union membership and, in fact, of any class of workpeople whether they are organized or otherwise. It is one of the basic reasons for restrictive practice and the everlasting bogey-man in our industrial cupboards. The almost insurmountable difficulties which the British Productivity Council has been forced to meet—and which the Council has practically overcome—

cannot be estimated in recognized terms any more than we are able to measure the degree of our success. There is this much to say, however. Those undoubted successes could quite easily be swept away in angry disillusionment if we were to find that repeated promises of full employment, by successive governments, are repudiated.

I do not wish to dwell upon this aspect of future relationship, but it is disturbing to know that there are many who voice more than a speculation that the current restrictive monetary policy, coincident as it is with redundancy and short-time working in our Motor Industry, is purposely enforced in furtherance of the Report of Lord Cohen's Committee which recommended the deliberate creation of unemployment.

My sole reason for giving mention to this regrettable state of affairs is to indicate the type and nature of the difficulties experienced, by employers and union leadership, when attempting to close the breach that has existed for centuries between us. This mistrust of managerial intention, by workpeople, is a problem needing patience and yet more patience. It also needs the strength of sincerity to be able to survive the continued sabotage by those among us who would seek to serve foreign born and anti-British policies. One thing is certain. However many setbacks we receive, the progressive employer and the modern-thinking trade unionist will continue steadfastly in the direction of establishing mutual confidence—with or without assistance from those extraneous sources who merely stand and wait. This is the one example where I might dispute with Milton!

At this point, therefore, we must accept that common ground has been identified—a common ground that is one of the fundamental necessities making it possible that trade unions *and* industry *and* commerce can exist. This is productivity. None of this trio could function without either raw material or finished product and, in every case, production is its life blood. Quite apart from the basic and common meaning of the word 'production' there are other ways in which it binds the two sides of industry into a complete whole.

Many of us here this evening have dabbled in Economics, at some time or another, and we have been taught to factorize Production into Land, Capital, Organization and Labour. It is customary, also, to set against each of these four factors what are known as Rewards; from Land we obtain Rent, from Capital comes Interest, Organization needs Salaries and, finally, Labour means Wages. The ultimate picture then reads Rent, Interest, Salaries and Wages and, providing these Rewards are economically balanced, we should all qualify in terms of the first part of that profound economic statement made by Mr. Micawber. I said that we *should* because, as we are all aware, it mostly transpires that we are in the category appropriate to the second part of that Dickensian statement.

Trade union philosophy regards the present fixation of balance in these rewards as something suspect. Rent and Interest are pre-determined, with Salaries very nearly so, and it is only 'Wages' that is left wholly in the air. We feel that if wages are to be determined by these three arbitrary pressures then, as trade unionists and as the people mostly affected, we should have some voice in the fixation of those pressures. I need hardly mention that, even among the most progressive of

employers, this recommendation finds something less than lukewarm approval.

Something of this nature will probably evolve in time yet to come. Something of this nature is essential if we are to preserve the state of balance between these four factors without the continuance of periodic nightmares that continually disturb the slumbers of successive Chancellors.

Lack of mutual confidence is something which had no definite beginning and constitutes a major obstacle in the scheme of industrial relationship. As far as workpeople are concerned, it has grown into character, psychologically, and springing directly from centuries of unplanned or unregulated systems of employment. One cannot dispel such an inbred condition overnight and of all the problems affecting employer/employee relationship I consider this to be the most serious in its indisputable effect upon a national economy which touches all of us.

Ask of any workman his opinion regarding the genuine urgency of productivity or whether he is prepared to accept, as factual, the basic position I have outlined and he will, sometimes after argument, admit its necessity and the validity of my claim. Unfortunately, in a high percentage of instances, he will then qualify his acceptance by using that futile little word 'but'. There are generations of history behind that three-letter word and it presents us with a colossal problem when used in this context.

Progress we *have* made—vast progress—due to higher standards of education and the easier dissemination of factual information, which is an advantage we have over our progenitors. The outstanding result of such a comparison, however, reveals that, whereas our forebears had to combat uninformed ignorance, we, in 1960, face a more sophisticated propaganda that is not unmingled with anarchism and which derives its power from vast fields of culpable apathy.

Each of these opposite extremes—subversive agitation and apathy—are phenomena which we have learned to accept as unfortunate back pressures generated and sustained by human progress. They attack the personnel of both sides of industry. I do not think that it will be possible to eradicate them entirely but it behoves employer and workman to exert his utmost endeavour in mutual assistance in order to effect some useful measure of control or counteraction. The conditions in employer/employee relationship have a tendency to provide ideal breeding grounds for either agitation or apathy and, therefore, it emphasizes the urgent necessity for closer unity between progressive elements in industry and commerce. This must be effected if we are to survive in a future in which science and technology are the dominant forces and if we in Britain are to continue to maintain our place among the great exporting nations.

Consequently, in pursuing their function or rôle in industry and commerce, the trade unions are burdened by these two highly undesirable passengers. It is lack of recognition of this unpalatable but undeniable fact that so frequently causes so many otherwise sane individuals to raise calamitous wails in the cause of freedom, managing meanwhile to include an impassioned demand that the freedom of others shall be curtailed and restricted. What is more to the point, they try to insist that restrictive processes shall be applied to the majority, that is, the trade unions. Who is there to-day that can truly state where trade union membership begins

or ends in terms of numerical definition? I cannot! There are over eight millions of individuals affiliated to the Trade Union Congress alone, and to this figure we must add that significant number who are in membership of those other unions—unions that recruit from many sources, including certain sections of our Civil Service, teaching professions and, in fact, up and down the social scale from the learned Judge at the one end to the newest and youngest office boy at the other.

Restrictive practice is born of combination, and combination is the direct outcome of economic pressure and exploitation. Instead, therefore, of attacking the effect it would surely be more within reason to investigate and eradicate the cause.

Any effective legislation designed to restrict by Statute the activities of trade unions must be capable of providing many impossible answers to many impossible questions. Where is the individual, even with the courage and fortitude of foolhardiness, who will attempt to lay down the line between permissible restrictive practice in one union as against prohibition in the next? When is it possible to deny the right of a workman to withdraw his labour in circumstances unacceptable to him without denying the right of an employer to close his factory when his workpeople insist upon industrial misconduct? Alternatively, is it possible to disapprove the action of the Law Society in forbidding an unregistered layman to plead for another in the Courts of Law, or compel a doctor to work with an unregistered 'quack' without, at the same instant, exercising similar disapproval of the skilled craftsman's objection to unskilled labour being placed on his work?

Discriminative legislation would, of course, merely worsen the position.

Dealing now, specifically, with workpeople, I have this much to say. If we are to fling aside, as undesirable, the voluntary and equitable nature of employer/trade union relationship and to fling it aside by virtue of legislative action, then we will be taking the first of those irrevocable steps down the spiral staircase which leads to systems of social legislature found wanting by British judgement. How many steps are there between Anti-Combination Acts backed by transportation or imprisonment and the forging of similar industrial chains with the concentration camp at the end of industrial dispute? How far, too, will this downward leading staircase take us below the standards of the Four Freedoms of the Atlantic Charter and the wise provisions of the International Labour Office in Geneva?

When all is said and when all is done, the aims and purpose of trade unionism are not so deadly in nature nor are they so fantastic as they are made to appear by those who profess opposition to them. I say 'profess' because I am unable to accept, in the vast majority of cases, that the innermost reasoning of such people is such as to reject unconditionally the claim of the workpeople for a fair and proportionate share of what their hands and brain have helped to create.

Do not let us become lost in the quicksands of '-isms' and Utopian theories. Let us rather face up to the fact that humanity, by using that reasoning power with which it has been endowed by a beneficent Creator, instinctively abhors injustice. If we are to admit the validity of the claim that the word 'fair' means what it says, then I do not envy the man, or woman, who takes up the task of proving that to act fairly is, in fact, to act inequitably or, in other words, that the

claim for a *fair* share of what he has produced is unjust on the part of the workman and that a *fair* share is a *disproportionate* share.

With minute exceptions, which in this age and day are unjustified, trade union recognition in Great Britain and most developed countries is an accomplished fact. Implicit in this acceptance of trade union operations is their functioning in the field of collective bargaining in all spheres where negotiations may be conducted, i.e., at national, local or domestic levels.

The example of the meagre number of progressive units who pioneered the contributions which organized labour is capable of making in matters not strictly embraced within the term 'collective bargaining' used in its rigid sense, has been quite widely followed not only during the war years but increasingly so in the post-war period. So we have the participation of the trade union movement as such, individual unions and trade unionists in joint committees sometimes of a tripartite character often confined to trade unions and industrial or commercial interests, although not so often the latter. Such committees deal with most aspects of educational, economic, technical and social matters and are evidence of the massive evolutionary changes which have taken place in a very short time indeed. Increasingly trade unionists are invited to become members of Royal Commissions and other such bodies dealing with diverse matters of the highest social, political and economic consequence, *ad hoc* high-level committees dealing with health and safety in many spheres, including that of ionizing radiations and nuclear substances, machine tools, etc., together with statutory bodies dealing with a variety of subjects—far too many to mention. It is generally admitted that the expression of the trade union viewpoint and the contribution which trade unionists make has proved to be of value. This criterion can, I think, be applied generally to the contribution made at other levels and especially at domestic levels where the guidance of trade union representatives, particularly in dealing with people, is invaluable. I would submit that this patterning must, in the national interest, not only continue but develop, and the trade unions certainly consider that, in the future, their rôle in this kind of activity is most important.

It is self-evident that, in an era where rapid change is the inevitable accompaniment of accelerating scientific and technological advance, the trade unions will increasingly be called upon to supply personnel who are equipped to deal with subjects becoming ever more complex in character. Sincerity, frankness and a full appreciation of the thinking of working people must always remain the fundamental attributes of those who are called upon to undertake this work, but considerably more is required.

For the trade unions to train adequately their people to the required standards is no easy task, especially in Britain where our financial resources are quite limited. Equally difficult is the problem of finding the personnel and making them available for these tasks and, also, to convince the average member that the time and effort spent in areas of activity which may appear to have no direct connection with his day-to-day problems and desires is to his benefit as a trade unionist. May I point out in this connection a danger which we face. There exists a tendency to refer to trade unions and trade unionists as though they were separate entities. Trade

unions are composed of and are trade unionists; there is no separation whatsoever. The danger is that there is a tendency to identify the trade unions solely with high-level officials who tend to be publicized because of their activities in high-level affairs. The dangerous situation thus can arise that senior officials may appear to be doing a good job in spheres of activity apparently divorced from the main body of their members. This can, in certain circumstances, engender adverse reactions.

A consequence of modern developments in industry, commerce and our general activities, is the ever-increasing degree of interdependence of plant-to-plant, industry-to-industry and individual-to-individual. The full extent of this situation is, as yet, imperfectly realized. Thus we have manifestations in many directions of the extent of the potential menace to our survival if unilateral actions are taken which result in serious adverse effects often completely disproportionate to the original difficulty and in locations far removed from the source of the trouble. One of the most difficult of the problems to be faced in the future is to inculcate into individuals and groups of individuals a conception of the responsibility they have to their colleagues and to the community in an era when a vast potential power for ill resides in their hands. One must admit it is very attractive indeed to contemplate a situation in which an ultimatum may be presented which, if rejected, would mean a major disruption. It is indeed trite to say that such actions are anti-social, *but* the task of preventing abuse of the power which interdependence confers is rendered vastly more difficult if bad examples are given in other directions. Anti-social practices are not the prerogative of trade unionists, and if other people use the power, or as it might be euphemistically termed, opportunity, to turn to their sole advantage such power, irrespective of the impact upon others, then it is going to be much more difficult to persuade trade unionists that they alone should display a social conscience.

Any attempt to qualify the function of labour and trade unions in industry and commerce *must* take into consideration all of this background that I have put before you. Perhaps, tonight, I have stripped the question of some of its evasive covering. If I have done so it is because I respect the powers of critical appraisal possessed by my audience, which, I am sure, is able to accept the academic implications and is capable of appreciating the psychological difficulties which influence the day-to-day negotiations between trade unions and management.

If I say, therefore, that the function of labour and trade unions in self preservation is precisely the same as the whole of industry and commerce I know that my meaning will be abundantly clear. One cannot sub-divide responsibility and invest the resulting sections with conflicting purpose and intention, for a house divided against itself will surely fail. British enterprise must not fail! Productivity and *increasing* productivity is our only safeguard.

I am aware that, in addressing this Royal Society, I have laid before you a deep and many-sided problem. I do so with complete confidence. A few short weeks ago I was afforded the privilege of discussing another problem in this same building—a problem which in its immensity presents appalling features. I am referring to the question of the proper uses of our leisure time, one to which the Royal Society of Arts is devoting its serious attention.

May I suggest that neither of these issues is a new issue, for if that which I have produced for your consideration is marked down in history and punctuated by Anti-Combination Acts so, too, is the question of leisure time similarly distinguished. If my memory serves me correctly, football was once prohibited by Statute in the United Kingdom and, surely, the playing of this game is indisputably tied to leisure time.

These circumstances should not disturb us unduly, for the Royal Society of Arts also has its roots in history, thereby demonstrating that all concerned are appropriate to each other. The solutions, which I look forward to reading with interest, will certainly contribute inestimable advancement to social science. It is in such ways as this that humanity progresses towards its destiny.

It is on this note that I would conclude my short address, quoting not my own words but those of a trade union leader in the United States of America. Walter Reuther, President of the United Automobile Workers of America, provided these words for us and posterity:

We have said many times that really the measurement of the greatness of our society is not how much economic wealth we have, nor the size of our material resources, nor the level of our technological development; the real measurement of the worth of any free society is the ability of that free society to translate technical progress into human progress, into human happiness, into human dignity.

That, Ladies and Gentlemen, if you will allow me, is the true and proper function of labour and trade unions in industry and commerce.

DISCUSSION

MR. G. VIVIAN DAVIES: It seems to me that the trade union movement to-day is suffering from the same thing which affects so many other organizations, and that is apathy. I joined a staff union some time ago and went to the local branch meetings where I found only a handful of people turned up, but the people who did were usually rebels and agitators. What used to happen when officers were elected was that the chairman, having failed to get people nominated for offices, in desperation would ask the ones present to volunteer, and it used to happen that the active Communists or fellow travellers invariably came forward and volunteered; once in office they started a sort of self-perpetuating organization. I used to speak to other members and ask why they did not turn up to branch meetings. They would say that they did not want to discuss politics which were nothing to do with union affairs. I told them that at least they should go to the annual general meetings, and they replied that they were often worse.

Now I think that sort of attitude is general throughout the trade union movement, and is one of the reasons why so many hot-heads are appointed to office at local level. Having got themselves appointed to office at local level they are then able to influence the policy of the union as a whole. While the top trade union leadership may be first class, at the other end of the scale we have these shop stewards causing trouble and unofficial strikes.

I should like to ask Mr. Carron a leading question. I am of the opinion that a secret ballot of the membership of a branch would soon put an end to that sort of thing, because although you cannot drag people to branch meetings, I am sure all of us will agree that at least a fair proportion of them would vote in a secret ballot. So you might get a reasonable type of office bearer. Yet the trade union movement will not allow secret ballots. Why?

MR. G. H. LOWTHIAN: I should like to put a supplementary question to Mr. Carron before he answers that. Is it not true that practically all the trade union leaders at national level to-day were themselves at one time these 'irresponsible' office holders at local level, and that this question of red shop stewards and Communist agitation applies to a very small minority of the active trade unionists on the shop floor?

THE LECTURER: Mr. Lowthian, I am not going to sell my own reputation. There is a good deal in what the first questioner said with which I would agree. There is a certain amount with which I disagree, and I think the basis of the question is rather off-beam. There is apathy within the trade union movement; it would be foolish to deny it. The trade unions, however, are not the only body in Britain who suffer from apathy: there are very few organizations that I know of who do not complain about it. The problem is that apathy is far more dangerous in some quarters than in others. Apathy is always one of the potential penalties associated with democratic processes. And if you want to preserve democracy, well, it is rather unfortunate, but we have got to put up with a degree of apathy. The degree varies. It is high in the trade union movement.

I believe I said in my observations that at least a partial cause of the apathy which we experience is in itself a back-pressure of social progress. Human beings tend to take the line of least resistance and to be a bit lazy, and in circumstances where things are going along on a relatively smooth keel people do not bother a great deal. I should say, by and large, that the average trade unionist feels that the individual who has charge of his industrial destinies has not done too badly, and is content just to leave the situation where it is. I know that that is foolish thinking, but nevertheless it persists. Conversely, I should say that if we fell on really bad times again I am quite sure that there is not a branch room in Britain that would hold the members of any branch in any trade union.

I do not know that there is any cure for apathy. Most people know my religion. I remember talking to a very distinguished and colourful prelate about this problem of apathy and agreeing with him that there was no way out of it. He said, 'In desperation I have been turning round in my mind the thought that perhaps I might instruct all the father confessors in my diocese that, when they have a Catholic trade union penitent before them in the confessional, instead of imposing the usual penance of prayers and good works they should impose the obligation to attend three future branch meetings of the trade union movement!' I said to his Lordship I was not quite sure whether that would be designed as a cure for apathy or as a real penance!

However, the basis of the question, that a secret ballot would cure apathy and would allow members of a branch to have expression, is rather misleading, because certainly so far as my union is concerned (and this would apply to a vast number of others, because most of our unions in Britain have very democratic constitutions), all the ballots for every officer are conducted secretly. We have a vast and elaborate system of taking ballots which is very expensive too. In the unions we adopt precisely the same voting practice as in local government and parliamentary elections, so we do not take machine guns out and compel people to vote. It is mortifying to us that so few people attend the branch meetings, and therefore because of that fact so few vote. I do not know whether the questioner was implying that on issues we should take a complete referendum of the membership? That would be impossible. For instance, to do a very rapid mental calculation, my union has in excess of 900,000 members in the United Kingdom and if we took a fair referendum, one unassailable from the point of view of probity, we should have to take a postal ballot, and to do that would cost (with administrative charges and so on) nearly sixpence per member. If my reckoning serves me accurately, each referendum would cost us the thick end of £30,000.

So that the secret ballot is not the answer. I do not know any answer except in exhortation—we are doing that all the time, but not with a great deal of effect. We

hope that at some time, and particularly on a major issue, members of trade unions will realize that the handling of their affairs is an extremely important matter in this age, when such a vast amount of power can reside within a particular trade union, let alone the whole trade union movement. A major cause for apathy in some branches in some unions lies in the fact that instead of most members sticking it out and dealing with these few subversive people in the appropriate way and reducing their clap-trap—that is not so difficult to do—instead of doing that, they become fed up and stay away and leave these people in control. In a democracy at all times we face that danger.

MR. HENRY LEVITT (Guild of Insurance Officials): I represent a professional trade union where there is no question of apathy, where members attend meetings in very substantial numbers, but where the employers refuse to grant recognition in 1960. Would Mr. Carron like to comment on the almost schizophrenic attitude of employers who, when they are engineering employers, recognize trade unionism, but as soon as they get into the sphere where there are professional trade unions, suddenly refuse to recognize trade unionism. Does that help to further the interests of trade unionism or business in the field of commerce?

THE LECTURER: I appreciate the difficulties of a number of trade unions in the sphere indicated by the questioner, and recognition in that field is a slower process than it has been in other fields. I am not quite sure whether I am accurate in saying that, because in the manual field particularly, trade unionism began a very long time ago. My union celebrated the centenary of one of its earlier amalgamations in 1951, so that I do not know exactly how far we go back. At one time it was not considered very respectable for non-manual workers to be organized at all, and so it might well be that to some extent our colleagues in that field are suffering from that rather out-of-date thinking. This is not providing much sympathy, but I would say that they are not completely alone in this difficulty.

In talking about the split mind, I do not think that even in their field they could quite surpass an experience which we as a union are undergoing at the minute! We have a perfectly legitimate, respectable official strike which is in its fifth or sixth week, in one unit of a company on the issue of trade union recognition. Another unit of the same company is very respectably identified with the Engineering and Allied Employers' Federation, which affords complete recognition, as all federated firms do under the agreement; and so here we have the instance of one vast international company in one location in Great Britain fighting a battle which was fought mainly in our field about sixty years ago. They are still fighting the battle for recognition in one location, but with complete and absolute recognition under all the engineering agreements in another location. So these things are still with us, but I am quite sure that in the end, Sir, your fight will be fought to a successful conclusion. And when it is, that will mean that the Chairman himself will get recognition!

MR. LESLIE LITTLEWOOD: Does Mr. Carron believe that trade unions by their structure and administrative methods nowadays are in any real position to declare themselves on behalf of their members in regard to fundamental issues of defence, such as the possession of nuclear armaments?

THE LECTURER: Members of the trade unions are, on occasion, called upon to decide what government in Britain will take charge of defence and other activities of the country. I think that if we are going to say that trade unionists are not capable of making up their minds on individual issues we have got to rule out of the franchise most of the population of Britain. The trade unionists themselves and their dependants and wives form a not inconsiderable part of the British electorate anyway; and there are quite a number of people exercising their vote in Britain who, whilst they are not members of trade unions, would nevertheless vote on the same levels in almost all respects as organized workpeople do. It could well be that in taking decisions within

the unions people could be mistaken; it could well be that too few people might be registering an opinion and that the opinion might not be representative. That is one of the penalties of democracy. But to say that trade unionists are not capable of making decisions of this kind is to say, disfranchise the people: because if you cannot decide the merits of one issue, then you are completely incapable of deciding who should rule this country.

SIR GEORGE EDWARDS (a Vice-President of the Society): From quite a lot of experience gained over the last twenty or thirty years, and in particular over a period when I had daily contact with the shop stewards, I was much impressed, and still am, by the sincerity and the determination with which a large number of them set about a job. The same sincerity so obviously lay behind Mr. Carron's talk tonight. I suggest, with respect, that the trade union movement is taking a risk in thinking that, because of apathy, not much can be done about the process by which local members are elected. There are in all levels of the trade union movement men for whom those of us on the managerial side have considerable respect, and there are others for whom we have little respect. I would put it to you seriously that the great strength and the great rôle which the trade union movement has to play are not going to be maintained unless you really get to grips with this problem of the local representation. It really must be a serious reflection of the feelings of the movement, which when all is said and done, is the body of the members. I would not necessarily agree with the secret ballot, but I believe that you are in danger of weakening the trade union movement at what is effectively the working level, and that you are not getting the same representation as the managerial side at the same level, because the processes of selection are entirely different.

THE LECTURER: I would not completely agree with you. Many of us would like to see a perfect society with perfect human beings in it, but very often we do not take the beam out of our own eye. Some unions have elections in the workshop for stewards; in other unions stewards are elected in branches. So there is no uniform pattern. I do not know how many of the thousands of shop stewards are not really representative. My union has got some tens of thousands of shop stewards alone, and these are multiplied in other unions of a bigger or smaller size. I know my own industry, engineering, best, and whilst it is true to say that we have some difficult stewards, at the same time there are elements of management which are equally unreasonable and foolish in their approach. If we get circumstances where two characters of that kind meet then you can expect difficulty. We should like to rub out those areas of difficulty, and I am quite sure that enlightened management to-day is increasingly taking steps to inform those connected with the handling of human beings of what industrial relationship facts are. I speak to many gatherings, and I am appalled at times by the lack of knowledge displayed. Both sides have a lot to learn.

Now here is the kind of thing which can happen; in a certain establishment in Wales they had a really first-class steward looking after a particular unit; a good, plodding, solid type of fellow. He had managed to do quite an amount of good for his members over a long period of years. Some circumstance arose connected with transport and this steward approached the management on innumerable occasions; not a finger was lifted; and as often happens in these cases the members became restive, turfed the steward out and elected a man who was of a very different order. His first effort was to tell the management on a Friday that there was this difficulty over transport and that if a 'bus was not laid on the works would be stopped on the following Wednesday. Before the following Wednesday there was a 'bus laid on. That kind of experience certainly suggests that management will get the kind of steward it deserves. One swallow does not make a summer, but that kind of thing is happening far more often than we would expect to find in 1960. Many of the unions, and the T.U.C., are spending perhaps far more than they can afford in trying to give stewards a broader

picture of the industrial pattern and endeavouring to inculcate responsibility and observation of agreements. Both sides are endeavouring to correct this position, and to look on the more positive side. I think that in the engineering industry alone every day there must be some thousands of problems settled between representatives of management and shop stewards, a vast number of which would be potential trouble spots and might lead to major conflagrations. I think that even though Sir George might feel our methods of selecting stewards are a little haphazard, yet in 1960, having regard to the vast number of amicable settlements arrived at through the instrumentality of shop stewards, we could easily make the position worse by precipitate methods. I think gradual evolution and progression is far better. There is this aspect: we shall always have rebellious activists among us.

MR. H. SMITH: Mr. Carron did touch upon this question of productivity. I am connected with the engineering industry on the technical side. With regard to the productivity committee, we find that if we want to serve on it we are permitted to do so, provided we sit on the managerial side. Not being a manager, I do not see why I should sit on that side. I should like to know if Mr. Carron has experienced this in other parts of the engineering industry, and what the T.U.C. is doing about it.

THE LECTURER: One would assume from the question that it is the representatives of the manual unions on the productivity committee who exclude you from sitting on their side?

MR. SMITH: No, we did not have any trouble from the manual unions. Our trouble was from the management.

THE LECTURER: Well, that shows that the representatives of the manual unions have a job of education to do with the management of your company, doesn't it? It is not a very good regulation (and I would say this to my own people as I would say it to management) to have this division into very tightly defined sides on a production committee. With a production committee in a works there should not be two sides at all. Surely every one on the committee is there to forward productivity methods, and to bring his intelligence and enthusiasm to bear upon problems that might be thrown up. I would not have expected that there would have been a separation into a trade union side and a management side. I speak as Chairman of the British Productivity Council, and you can take that back to your management, if you like. It is a mistake to divide a committee of that kind in that way, because in many circumstances I see it having a tendency rather to retard productivity than to forward it. If there are going to be two sides, then at some time or other there is going to be argument instead of concentration upon methods of advancing productivity.

MR. VIVIAN DAVIES: In my capacity as a consultant some years ago I had to reorganize a big works in Scotland, and had to tell the Board of Directors that one of the troubles was that they were completely out of touch with their workpeople. They asked what was the remedy, and I advised them to set up a joint productivity committee. They agreed, and so I told the two union representatives of the suggestion, but they were not happy about it. I said, 'Well, we are told by the Government to do this; surely you cannot object?' They asked how I was going to set about it, and when I replied that it would have to be by an election among the workpeople, they said, 'Oh no, we could not agree to that'. 'Surely you will be elected because you are the representatives of the union?' I asked. 'Not likely', they said, 'We won't; they do not like us enough for that'.

What would Mr. Carron have done in such a case?

THE LECTURER: It is difficult to generalize. What might be a suitable formula in one location might produce very adverse results in another. Had I been in your position (and now I am speaking in a rather academic way), I should have thought that the best thing to do would be to have a talk with the local trade union official and point

out the difficulty; remind him that the trade union movement in Britain is conditioned to increasing productivity because it realizes that is the only way we can improve our standards, and ask him to have a talk with his people and try to get it straightened out. I think that a trade union side problem is far better handled by trade unionists than by management. If you had carried out that procedure and it had failed, there would have been little chance at that stage for management to succeed.

MR. VIVIAN DAVIES: We did just that, Mr. Chairman; we consulted the trade union representatives, and as I have said, we had no more success.

THE LECTURER: I can understand that happening too!

MR. A. C. BAGGS (*New Daily*): Don't you think that industrial productivity could increase if you were to remove some of the restrictive practices?

THE LECTURER: Well, so-called restrictive practices are being removed all the time as we evolve. Most restrictive practices have certain origins; sometimes very beneficial origins—they were instituted for safety reasons, and so on. In other cases they were a device for protecting the employment of people on the one hand and for protecting craftsmen and their trade and remuneration on the other. Now, because of evolution, practices which were once recognized as a good thing can have the reverse effect; but we should not get the restrictive practices position out of proportion.

If we take vast areas of industry where technological advance has been very rapid we can say that by and large the incidence of restrictive practices has been very small. I would refer again to the industry I know best, engineering. During my relatively short space of time I have seen almost two revolutions in engineering. One could say they have come in stockinged feet, and there have been no major difficulties. At one time the engineering industry was virtually a wholly craft industry with a percentage of labouring personnel; then, with improved techniques and processes and inventions those proportions changed until at one period roughly 60 per cent of the labour force was skilled, and about 30 per cent consisted of an entirely new category which, broadly, we would term semi-skilled; and a possible 10 per cent labourers. (My percentages are not accurate, but the proportions are near enough.) Then as development proceeded, the proportions were reversed to about 60 per cent semi-skilled, 30 per cent craft and a constant 10 per cent labourers. Now we are witnessing another turn round because of development. And all this without any major problems arising at all. There are one or two sections of industry where, because of certain characteristics, we would find the incidence of restrictive practices irritating: for instance, in shipbuilding, a compact industry where almost overnight we had whole categories virtually wiped out. The welded ship, the prefabricated ship, has almost eliminated such trades as riveters. These people have felt concern for their future. The incidence of newer techniques has also promoted problems between trades such as those of shipwrights and boiler-makers, and naturally shipbuilding employers deplore the difficulties which arise. There is a broad recognition that these are problems arising from evolution and that there is no easy way out.

Only gradually are we easing ourselves out of these situations, but it is going to take time, especially in these compact, tightly knit industries rather than in widely spread industries such as engineering. We should not get restrictive practices out of proportion. Some people make a great deal of noise about them, and I agree they are irritating, and illogical. If we could make this world perfect there would not be any.

MR. M. C. P. HEWITT: Does Mr. Carron advocate having units set up not on the basis of trades but of industries, so that if there is difficulty in one industry where all are members of the same union, then one has to a certain extent removed the barriers which exist between the various unions within the industry? Would Mr. Carron care to comment on this?

THE LECTURER: I should say that it is a fallacy. It is comfortable in theory to have the vertical union, where everyone, say from the chairman of the company down to the last office boy, is in the same union.

There is a field of employment in Britain where in theory that could happen, but so far it has not materialized. I was in the United States of America just over a year ago, and a union with which my own union has very considerable contact was having a tremendous problem. The union was the Industrial Union covering the motor industry, and their problem was a familiar one to us in Britain. The toolmakers within the industrial union were in rebellion and threatening to break away because they felt (as most toolmakers in Britain do to this day) that the craft personnel had their differentials so reduced that the toolmakers were having an unfair deal. This is a perfectly simple everyday problem existing in most engineering establishments in Britain. The fact that all the workers are in one union does not necessarily mean that all is harmony and peace. These internal strifes and differences and difficulties can be just as pronounced when all trades are in one union. On the other hand, it is a fact that in Britain we have one or two unions which have a horizontal coverage, and I should say that some of them have been troubled in recent times by strikes of one category of members against other categories. May I finalize that question by saying that as a craftsman myself, and a member of my own ancient and distinguished union, I prefer our pattern?

MR. J. SMALL: May I ask Mr. Carron, as a member of a trade union, whether he feels that trade union officials are paid enough? I think to many of us, dues for union membership seem almost nominal, and members will rarely take an intense interest in anything unless they are going to pay something for it. Again, one hears a lot about the recruitment of young union officials; whereas the present union officials have come up the really hard way and have learnt the hard way, this may not be true of their successors. Are the unions going to pay the right sort of salaries to attract the right sort of specialists of the future?

THE LECTURER: I am quite sure you would think I was not speaking truthfully if I said I thought I was paid enough!

The trade unions of Britain were having hard times right up to the beginning of the last war, and the poverty mentality does not die very readily. There are still quite a number of people who can remember the time when the general offices of my union were in pawn, when we had not anything at all; and the kind of thinking so generated tends to persist. It is rather unfortunate that when money values began to change, an adjustment of salaries and contributions and so on did not follow immediately. The reason for it is as I have described. There is this memory of the time when a vast number of trade union officials had no offices or staffs, operated from their homes, and did this from very necessity.

But a more important aspect is that in our trade union movement the spirit of service has always been high. Now, to be frank, it is possible not only in trade unions but in other locations, to exploit service and loyalty. We all, as a community, shamefully exploit those people who are reluctant to do anything drastic to help themselves, those, for example, who are employed in hospitals. To some extent that applies in trade union fields, and I should not be honest if I said otherwise. I certainly think that it will have to be corrected in the future because it is quite obvious that if the position got too far out of balance, a situation could arise when it would be very difficult to secure recruits of the right calibre. This can apply to any industry and in fact has been a serious problem—the relationship of supervisors' salary levels to those of the people whom they supervise.

Recruitment to full-time official status in trade unions is rather more difficult. It is easy to say that in the second half of the twentieth century, because of the responsibilities placed on trade union officials, they should all be university graduates.

I cannot see that coming about at any time in our movement. The individual trade unionist who is electing an official (at least in the manual unions) does not base his assessment on educational attainment, but on the individual's ability to operate successfully on behalf of the people whom he represents, and even more so on the basis of loyalty, great loyalty, to the people whom he represents. I think those will always be the qualities which transcend a purely educational attainment—at least in Britain.

THE CHAIRMAN: We have had this evening what I would call a typical address, talk and discussion from Mr. Carron. It has been thoughtful, thought-provoking and courageous—a quality which those who know him always associate with him. I ask you to join me in a hearty vote of thanks to him.

The vote of thanks to the Lecturer was carried with acclamation and, another having been accorded to the Chairman upon the proposal of Sir George Edwards, the meeting then ended.

ERGONOMICS: FITTING THE JOB TO THE WORKER

A paper by

C. B. FRISBY, Ph.D.,

*Director, National Institute of Industrial Psychology, read
to the Society on Wednesday, 11th January, 1961, with
the Rt. Honble. the Earl of Halsbury, F.R.I.C., F.Inst.P.,
in the Chair*

THE CHAIRMAN: The National Institute of Industrial Psychology, over which Dr. Frisby has ruled for so long, has been responsible for far more features of our daily lives than most of us are probably aware. For example, it was the Institute under Dr. Frisby that made this basic discovery: you get more work out of people during the period from breakfast to luncheon if you give them ten minutes for a cup of tea in between.

It is an extraordinary thing that people are prepared to make jobs for workers which they don't have any idea of fitting to the worker. One now classical story concerns the gun turret of a fighter aircraft, which came into use at the beginning of the war. The turret was the work of two designers, one entrusted with the top half of the arrangements and the other with the bottom half. The man entrusted with the bottom half was a very large man about six feet two inches high; his colleague entrusted with the top half was a little man about five feet four inches high. Between them they produced a gun turret which could accommodate no one. A gunner who could reach the pedals could not shut the lid. If, on the other hand, he could shut the lid and seal himself into the turret, he was powerless to operate it, not being able to reach the pedals. This is what happens unless you fit the job to the worker.

The following paper, which was illustrated with lantern slides, was then read.

THE PAPER

'Ergonomics' is a word which was coined some ten years ago by a group of people who were proposing to set up a small learned society to provide opportunities for meetings and exchange of views between research workers drawn from different disciplines, but who had a common interest. 'Ergonomics' is derived from two Greek words, and means literally 'the customs, habits or laws of work'. The founders of the Ergonomics Research Society were men who had been working during the war on military problems arising from the design of equipment to take account of human capacities and human limitations. They included anatomists, engineers, physiologists and psychologists.

Ergonomics is not a term, therefore, for a new discipline. Rather, it denotes a field of interest or an approach to the problems of human work. In the United States the term 'human engineering' is the one most commonly used with the same significance. One sees sometimes references to work in 'biomechanics', a term with a similar meaning.

The field of ergonomics or human engineering is essentially that of the mechanics of human performance. It is man in relation to the physical factors in the environment in which work is done which is studied, and 'work' is work in the sense of the physiologist, that is, expenditure of energy. There is a very important distinction to be recognized between physiological work and work as the man in the street understands the word, to which I shall return later.

The physical factors in the working environment can be conveniently grouped as follows:

The surroundings. Lighting, heating and ventilation. Noise and vibration. Dust, odours and toxic substances.

Tools and equipment. Hand tools, jigs, benches, seating. Equipment used for lifting and transporting material.

Plant and machinery. In particular, the nature and location of displays, which indicate to a man the way the machine is performing, when action is required on his part, and the results of this action. Secondly, the nature and position of controls used for operating the machine or system.

The arrangement of working spells, shifts, watches—an organization problem—can also have an important bearing on performance.

The problems of the first group, the surroundings, are sometimes referred to as the field of occupational hygiene, and toxicology is in the province of industrial medicine rather than in the ergonomic field.

Although the word 'ergonomics' is new, the idea behind it is old, old at least in the short span of time during which man's behaviour has been studied scientifically. Studies aimed at throwing light on the laws governing human performance in the psycho-physical field have been undertaken in psychological laboratories since at least the 1880s. And anatomy and physiology are older sciences than psychology.

Although a small beginning had been made before the First World War in the scientific study of work in industrial conditions in this country, the inquiries of the Health of Munition Workers Committee, which was formed in 1915, are usually taken as the starting point. This Committee had been established specifically to look into the health problem in munition factories when signs of declining output became apparent in 1915.

The Committee's investigators provided some striking demonstrations of the relationship between, for example, hours of work and output. When the Committee was wound up, discussions between the Medical Research Council and the Department of Scientific and Industrial Research led to the establishment of the Industrial Fatigue Research Board in 1918 under the Medical Research Council. The title of the Board was changed a few years later to 'Industrial Health Research Board' and its terms of reference accordingly widened. The Board's team of research workers, which included physiologists, psychologists and statisticians, established on a firm foundation systematic studies of man in his industrial environment. The National Institute of Industrial Psychology, an independent scientific association, was established in 1921, having as its main aim the application in industry

and commerce of the principles of psychology and physiology. In its early years its studies in industry were principally in the ergonomic field.

There has now been accumulated a considerable amount of information about the relationship between different physical factors and work performance. Several summaries of this information have been prepared, and they are quite bulky volumes. I do not suggest that there is no need for further research; but so far as the world of industry is concerned, the primary problem seems to be how to ensure that what is already known is in fact used. I shall endeavour to summarize briefly some of the principles which have been established, and to give a few illustrations of the results of research.

Human dimensions are clearly important in the design of most machinery and equipment in the use of which men are concerned. Ideally, those points of a machine where the man has to load material or take it off, where he has to observe indicators, move levers or wheels, or depress pedals, should be so arranged that all these points are accessible without excessive reaching, stretching, or stooping, and that the man can adopt a comfortable working posture.

Human beings vary a great deal, of course, from one to another in their different dimensions, but the designer's problem is not to establish the average dimensions of the likely workers of his machine but rather to discover the range of measurements among the population from which the users of his equipment will be drawn. It is no use providing conditions which are just right for only the average range, numerous though men in the average range may be. He usually has to arrive at a compromise in which the maximum convenience for the majority can be achieved in conditions which nevertheless make it possible for virtually any one of the likely potential users to operate effectively and not at a high cost.

In addition to the range of human dimensions the designer needs to know the kind of force which can be exerted on the controls which his machine is going to incorporate by a man in the posture which the machine will demand.

There is now a mass of anthropometric data available as a guide to designers of equipment. It is true that a great deal of these data relates to the dimensions of special populations, particularly men in the Fighting Services, but nevertheless they can be a useful guide with other populations.

LIGHTING

The nature of a task determines the amount and kind of light that is needed if it is to be efficiently performed. The smaller the details which have to be seen, and the greater the differentiation between them which is necessary, the greater is the amount of light required. The amount of time available to the viewer is also an important point. If the viewing time is very short, more light will be required.

Ease of seeing is affected by difference in brightness between the object at which one is looking and the background against which it is viewed. It is easier to read printing in black on white paper than in black on dark brown paper. The amount of light required for a particular task is very much related to the contrast of the objects to be seen with their background. One needs, for example, very much more

light to sew black cloth with black thread than to sew black cloth with white thread or thread of some bright colour.

The problem is not, however, a straightforward one of the amount of light. The angle at which the light falls on the surface to be viewed is sometimes very important; for some tasks a diffused shadowless light is best, while for others shadows cast under a direct light assist the viewer.

Glare is a great handicap to easy seeing, and it can arise not only from naked light sources within the range of vision but from reflections from polished surfaces.

The human eye is capable of an immense range of adaptation. One can read a newspaper, albeit with some difficulty, in bright moonlight, when the amount of light falling on the sheet will be less than $\frac{1}{10}$ of a foot-candle, and one can also read a paper in the full sunshine when the intensity may be as high as 10,000 foot-candles. Of course, neither of these extremes is ideal for the visual task of reading black print on white paper, and most people would find a sense of strain developing if they tried to read for very long with either of these intensities. In lighting, as in most other aspects of the physical environment, man's adaptability has tended to conceal from practical people the importance of determining the most favourable conditions for seeing at any particular task. Conditions which are unfavourable may not prevent a man completely from doing the task, but they have as their concomitants ineffective performance, with loss of speed and accuracy, and strain on the eyes.

High intensity of artificial illumination over anything except a very small area has, of course, been possible for only a relatively short period of years. Even when high intensities became physically possible, it was expensive to provide them. In the 1920s, it was common to find illumination in factories and offices of less than five foot-candles. Consequently, one reads in the literature of that period cases such as one where increasing illumination from three to eleven foot-candles was followed by an increase in output of 8.5 per cent. One early study of the Industrial Fatigue Research Board¹ of compositors in a printing works showed that with artificial illumination at the level of two foot-candles, output was 25 per cent less and errors 100 per cent more than under daylight conditions. When illumination was increased to seven foot-candles, the loss of output was reduced to 10 per cent with only a slight increase in errors. With a further increase to 20 foot-candles, the daylight rate of working and the daylight accuracy were found to be maintained for periods during which the artificial lighting was in use.

Twenty foot-candles was a high intensity of illumination in 1927. In modern factories, it is common to find general illumination provided at a level of 20 foot-candles.

But there are still plenty of lighting problems to be solved in most offices and factories, because intensity of illumination is not the only factor. The amount of artificial light available has in general been enormously increased, but the tendency has been to provide this additional light in the form of general illumination over the whole area. In many cases what is really required for easy seeing is some local source of illumination which can give a direct beam of light from a particular angle.

HEATING AND VENTILATION

The relationship between the temperature of the environment in which work is performed and man's efficiency is a complex one, firstly because of the influence of the kind of work being done, with its effect on the amount of heat generated by the man; secondly, because of the effect of humidity, and thirdly by the nature of the ventilation available.

It is everyone's experience that at low temperatures, when fingers become numb, there is a loss of manual dexterity, and performance at delicate and intricate manual tasks may well become impossible.

It is common experience, too, that at higher air temperatures there is much more discomfort if the humidity of the air is high than is the case when it is lower, and again everyone knows that, when the rate of air movement past the body is high one feels cooler than when the air is stagnant. There are other factors, of course—the nature of the clothing which is worn and the effect of radiant heat.

If the air temperature is sufficiently high, and particularly if the humidity is high and the air movement low, heavy work can be followed by a heat stroke. In rather less adverse conditions, a human being may be able to tolerate them, but his working efficiency will be substantially reduced. Even in light work, involving little muscular effort, above certain temperatures man's efficiency declines.

Although to most people ventilation appears important because of its effect on the air one breathes, in fact in most circumstances its importance lies in its influence on the air which surrounds one's body. A notable exception is the case where toxic fumes, odours or dusts are being produced, and are removed by ventilating equipment. A very small rate of air change is adequate to ensure a sufficient supply of oxygen for the lungs and to prevent the carbon dioxide concentration in the air from rising too high. But this, except when temperatures are very moderate, is not sufficient to remove the surplus heat the body itself produces, and which is related to the amount of work being done. This is not only a psychological question of comfort. If the heat generated by the body is not dispersed sufficiently quickly, the temperature of the body must rise, and the point is reached where there must be a decline in the work done if there is not to be a collapse. At still higher temperatures, collapse is inevitable.

It is, therefore, the cooling power of the air which is particularly important in the problem of ventilation.

The first report of the Industrial Fatigue Research Board,² published in 1919, demonstrated that temperature can be directly related to performance in an ordinary industrial situation. Studies made in a number of tinplate works, where the processes led to high air temperatures, with much exposure of workers to radiant heat, showed a very close inverse relation between the curve for output and that for air temperature throughout the year. As the temperature increased in the summer months, output declined, only to rise again as the temperature fell once more with the approach of winter.

This report also emphasized the importance of ventilation in overcoming the disadvantages of increasing temperature. In a group of factories doing similar work, there was found to be very much less decline in production during the

summer months in those where there was good ventilation than in those where the ventilation was not very effective, and one plant, which had no artificial ventilation, showed by far the largest decline in production in the warmer months of the year.

The National Coal Board³ has investigated, in collaboration with the Medical Research Council, the problem facing Mines Rescue teams who have to work in conditions where breathing apparatus must be worn, and temperature and humidity may be very high. The problem is: for how long is it safe to let the volunteer rescue worker continue the heavy labour involved? Tables have been produced showing the safe periods for the range of dry bulb and wet bulb temperature likely to be encountered in rescue work underground. For men wearing compressed oxygen apparatus in fully saturated atmospheres, for example, the safe limit is shown as 60 minutes at 80°F., declining to 19 minutes at 100°F.

NOISE

Less is known about the effects of noise on performance outside the laboratory than is the case with lighting and heating. It has been recognized for a very long while that continued exposure to noise of high intensity would lead to loss of hearing. There have been occupational deafnesses, such as, for example, that of the boiler-maker. But until comparatively recently there was little evidence about physiological damage done by noise at the loud as opposed to the intense levels. Nor was there very much evidence that moderate to loud noise of a fairly continuous type had much effect on human efficiency, though it had been recognized, of course, for a long while that intermittent noise tended to be a severe handicap in mental tasks. In recent years, the development of more sensitive and accurate measuring equipment has made it possible to measure the acuity of hearing of an individual at different frequencies. Other equipment has been devised which analyses noise into the various frequencies of the sounds of which it is made up and records the loudness at the different frequencies. High intensity in the higher frequencies does much more damage than high intensity at the low frequencies. It is probably fairly generally accepted at present that, if the sound pressure level exceeds 85 decibels and the ear is to be subjected to noise at this level continuously, then protection of the ear to reduce sound pressure on it is necessary, if damage to the hearing is not to be suffered. This level is somewhere between that created by very heavy street traffic and that caused by the arrival of an underground train in a station.

Man's adaptation to noise seems to be primarily on the psychological plane—he can tolerate it, but it nevertheless has its effects on his performance. Again, I will quote the results of two experiments, one reported in 1935 and one in 1960. Both were carried out in factories; both compared the working results of two groups of people on the same kind of work; in both cases noise was reduced for one group but not for the other.

In 1935, Weston and Adams⁴ recorded the results of the wearing of ear-defenders by ten weavers. These devices considerably reduced the sound pressure level on the ear, and from records taken over many months it was found that the personal efficiency of those wearing them had increased by 7½ per cent.

Broadbent and Little⁵ compared quantity and quality of work of operators of ciné-film perforating machines. In one room where the machines were installed, the sound pressure level was reduced by the use of sound absorbing materials on walls, ceilings and baffles between machines.

Although the quantity of work done by the workers in the experimental group did not differ from that of the control group in rooms where no insulating material had been installed, the quality of their work was significantly higher.

VIBRATION

Vibration is a factor which can be of considerable importance in some circumstances—with some hand tools, the road-drill for example, or where the operator sits or stands on a machine which is vibrating. Physiologically, the most dangerous form is high-frequency vibration, where in extreme cases tissues may be seriously damaged. Low frequency vibration is usually countered by the man by body movement, but prolonged exposure to this kind of vibration can lead to motion sickness, and even in short spells there is usually a decline in the accuracy with which visual and manual tasks are performed.

THE DESIGN OF TOOLS AND EQUIPMENT

We can recognize the fitness for purpose as well as the beauty of products of the old craftsman. The tools used in a craft such as wood-working reflect the craftsman's recognition of the importance of having tools which are just right for certain operations. Consider the range and variety of chisels or saws, each having been developed by the users of these tools to permit the accomplishment of a particular task.

The old practice by which a craftsman, even if he worked whole-time for one employer, provided his own tools, must have encouraged this process of developing special tools for specific purposes.

When we look at the hand tools used in modern industry, particularly in the simpler repetitive operations, we often find the same kind of tool, say a screw-driver, being used for a number of jobs where the needs are decidedly different, and where in a craftsman's workshop different tools would have been used for different operations.

An illustration of the effect of tool design on performance is provided by the shovel. No one shovel can be equally suitable for all shovelling tasks. The nature of the material to be shovelled is of course the primary factor—its bulk, consistency and specific gravity. If the material is stiff and unyielding, for example clay, there is a distinct advantage in using a shovel with a point—like the spade in the pack of playing cards. If it is loose and fine, say sand, a straight-edged shovel with raised sides is desirable. If the material is coke, then the shovel blade can be large, to carry a load which is still not very heavy. If it is coal or sand, then although the same shape of shovel is suitable, the blade should be much smaller. There is an optimum weight of load and if one has to go on shovelling for long periods a load which is too large proves very uneconomic in terms of human energy.

The height of the bench, and other adjacent working surfaces, is important in

relation to the operative's posture. For many tasks it is possible, with the provision of well-designed seating and foot rests, for the worker to stand or sit at will. This permits a change of posture which reduces fatigue. On many industrial tasks to-day, static fatigue is the main problem; fatigue, that is, arising not from active muscular effort but from the necessity to maintain a particular posture of the body throughout the working day—and all too often, a somewhat unnatural and uncomfortable posture. It is well worth while giving a good deal of attention to apparent details of seating and foot-rests, in these circumstances.

Henry Ford⁶ recorded that when he first set up moving assembly lines for his cars—in 1914—he arranged two lines, one with a height of $26\frac{3}{4}$ in. and the other at $24\frac{1}{2}$ in., specifically to 'suit squads of different heights'.

PLANT AND MACHINERY

Power-driven machinery, as it began to be developed for use in factory industry, was of two kinds. One type, appropriately called 'machine tools', harnessed mechanical power for use and control by a man who was still a craftsman. A second type of machinery demanded not the direct and active form of control of the machine tool but rather a feeding and monitoring type of performance, or the simple repetition of a number of movements of controls.

The engineers' aim in producing machinery of this kind has been to make it as automatic as possible, to reduce the time required to train operators and to produce as much as possible with the minimum of human labour. The designer has been faced with mechanical problems of increasing complexity as machines have been demanded to undertake more and more operations formerly recognized as skilled. Perhaps this is one reason why so much industrial machinery of the highest mechanical ingenuity appears to have been designed with very little thought for the capacities and limitations of the human beings who are going to be responsible for its operation.

Consider, for example, power presses used in the production of countless small metal stampings. Very many moderate-sized power presses impose on the operator a posture of extreme discomfort, seated in a crouching position with arms thrust forward and outward, one leg bent up under him to operate the treadle controlling the descent of the head of the press.

There is also the question of safety guards. Machines were designed—again the power press is a tragic example—which made it possible for the operator very easily, by a failure of attention or an awkward movement, to inflict serious injury upon himself.

Scientists sought to draw the attention of industry to the importance of considering the simple facts of human anatomy and physiology a long while ago. Thus Weston, in a section on Machine Design, in the third Annual Report of the Industrial Fatigue Research Board, published in 1923, stressed the unsuitability of much industrial machinery. The points to which special attention should be paid in designing machines, he wrote, should include

... the shape, size and position of levers and hand-wheels, and the power required to operate them. Others which are obviously important are the height

of the working plane, the area which has to be kept under observation, the extent to which the operative may be required to reach, both in horizontal and vertical direction, and the number of controls, together with the order in which they are arranged.

He suggested that one reason for poor design might be that the manufacturers of many industrial machines were not themselves users of their products, and accordingly the importance of details of great concern to the operative could be overlooked.

The effort required to operate a certain control, for instance, may appear in no way excessive when it is operated once, or for a short time during a test, but under normal working conditions, when it has to be operated perhaps fifty or sixty times an hour, the energy expended by the operative becomes very considerable.

Similarly, the adoption of a certain posture necessitated by the construction of a machine may be a matter of small consequence when it is adopted for a short time, but when it has to be maintained for a large part of the working day it may become not only unpleasantly fatiguing but definitely injurious to health.

But factory machinery making excessive demands on the human frame has continued to be produced and operated. This is possible only because of man's remarkable adaptability, which has prevented or at least delayed recognition of the importance of so designing material objects used or controlled by men that they make the least demand on this quality. Adaptation is achieved only at a certain cost in health and efficiency.

So long as the handicaps imposed by the designer on the operator were mainly of the anatomical and physiological kind, man's adaptability cloaked them. It is true that industry and society paid a price in loss of production and unnecessary ill-health. But at an early stage in the last war, problems of a different kind arose. Some types of military equipment, of the highest engineering ingenuity, made psycho-physical demands on the operators which very few could meet adequately for military purposes. If the operator of an industrial machine is not able to control that machine perfectly, it will not produce all it should. But if the operator of predictor equipment designed to control anti-aircraft guns, for example, fails to use it to its capacity, he may not have a second chance, while the target he is there to protect may be destroyed.

The Services found that as certain kinds of military equipment increased in complexity it became more and more difficult to find men who could operate them to the standard required. Approaches were made to psychologists for advice on how to identify those who had the necessary aptitudes. They recognized, in studying the equipment, that the true problem was not one of selecting men, but of modifying the equipment to bring its operation within the capacities of the many rather than the exceptional.

The engineers had in fact reached the limits of human adaptability in the demands they were making on men. This was the new feature in the situation, and it arose very often because the operator's task involved responding in a variety of ways to a variety of signals presented to him by the equipment. The combination of signals, the display, as it is termed, with the associated controls, presented a pattern so complex that very few could respond correctly with sufficient speed and accuracy to satisfy military needs.

A very common form of display is the instrument dial, and a great deal of research has been carried out to determine the most legible, unambiguous dial designs for different conditions. Sometimes a dial provides information which need be only approximate; on the other hand, it may be used to obtain an exact reading in miles per hour or pounds per square inch or so forth. A dial is not necessarily the best form of indicator; sometimes a vertical or horizontal scale is better, or a counter type device, such as the mileage recorder on a car dash board.

Man seems to have a natural expectation about display movements. On a vertical scale, for example, the higher readings should be at the top; with a dial, the needle should move clockwise to indicate increases in value.

And there seems to be a natural movement for controls related to displays. If a control is used to increase something, which is shown on a dial, vertical or horizontal scale, then turning a knob to the right should result in the pointer moving round a dial in a clockwise direction, or up a vertical scale or to the right with a horizontal scale.

There is now a mass of information available about display design for different purposes, and about the legibility of figures and scales. It is highly relevant to the most modern type of automated equipment in industrial situations, such as power houses, oil refineries and other process industries.

A great deal has also been done about controls; there is the question of the direction of control movement in relation to the display to which I have referred; there are problems of shape of knob to facilitate identification in darkness, and to reduce risk of confusion. When should one use levers or cranks or knobs, one- or two-handed controls? What leverage, spring loading or inertia is desirable in different circumstances?

The military studies were not limited to displays and controls. Anatomists, engineers, physiologists and psychologists have collaborated in the examination of all kinds of gear, from gloves to the most elaborate electronic devices, in the attempt to ensure that the design was in accordance with human needs and capacities. And this work goes on.

Why is it that in the industrial field there is still so much that is deplorable in its human engineering? Perhaps the main reason is that engineers do not normally receive any training in biological science; Weston in 1923 advanced the theory that machines were badly designed because the designers did not use them, and thus were not led to recognize their failings from the operator's point of view. This always seemed to me to be a primary reason, but I am beginning to wonder. One must assume that the designers of motor cars use their products, and yet in many respects cars have been getting worse from the user's point of view—and very much worse from that of the maintenance mechanic.

Motor-car design appears to be largely determined in some curious way by fashion. The provision of a comfortable driving position, in which controls are sited for convenience of use, where the driver has a clear view in front, to the sides and to the rear, gets very inadequate consideration from some engineers. Variation in height and girth, in length of leg and length of trunk, goes unrecognized, or at least the possibility of variation is provided for only by an adjustment of two

or three inches in the position of the driving seat. In some cars windscreen wipers clear only part of the screen, leaving a blind spot in the centre. In many, the head-lamp dimmer switch is on the floorboard, giving the left foot two controls to operate, both of which can be required at the same time.

In the long run, I suppose it is the attitude of him who pays for a machine which has the greatest influence on the designer. If the managers of industrial undertakings became more aware of the handicaps imposed on their workers, handicaps which are reflected in loss of output, in sickness absence and labour turnover, they would perhaps demand that machine manufacturers should take more account of human capacities and limitations in the design of their equipment.

CONCLUSION

The sub-title of this paper is 'Fitting the Job to the Worker'; in the ergonomic field we are directly concerned only with the physical environment. The psychological environment can be equally important in its bearing on man's effectiveness and satisfaction in his working life. The distinguishing feature in work, as we normally use the word, is that it is a form of activity in which there is an element of compulsion.

We work because we are obliged to work. The element of compulsion for most people, of course, is the economic one, but there are others, for example the creative urge of the artist and the sense of vocation which drives some to undertake onerous duties with very little financial reward. Perhaps the compulsive element in work reinforces man's adaptability. He accepts conditions as inevitable and adapts to them, if he can.

The element of compulsion conditions very largely our behaviour in our working lives. Man at work is not merely expending energy; the best possible adjustment to his physical environment may still leave him inefficient and dissatisfied. It is not enough to fit the physical conditions of work to man's capacities and limitations; it is necessary to provide a psychological climate in which he will be both satisfied and effective. To solve all the problems of *how* a man may work at the highest performance level can still leave unanswered the question of *why* he should work at this level.

REFERENCES

1. H. C. Weston and A. K. Taylor, *The Relation between Illumination and Efficiency in Fine Work (Typesetting by Hand)*. Joint Report of the Industrial Fatigue Research Board and the Illumination Research Committee, 1927.
2. H. M. Vernon, *The Influence of Hours of Work and of Ventilation on Output in Tinplate Manufacture*. Industrial Fatigue Research Board Report No. 1, H.M.S.O., 1919.
3. National Coal Board Medical Service: *Reactions of Mines-Rescue Personnel to Work in Hot Environments*. Medical Research Memorandum, No. 1, National Coal Board, 1960.
4. H. C. Weston and S. Adams, *The Performance of Weavers under Varying Conditions of Noise*. Industrial Health Research Board Report No. 70, H.M.S.O., 1935.
5. D. E. Broadbent and E. A. J. Little, 'Effects of Noise Reduction in a Work Situation': *Occupational Psychology*, 34 (1960), 2, pp. 133-40.
6. Henry Ford, *My Life and Work*. William Heinemann, 1922.

DISCUSSION

MR. P. K. SHAHANI: Does Dr. Frisby not feel that if there was a motor car which was the last word in design and efficiency, it might not sell?

THE LECTURER: No. I think that if a motor car was designed for the comfort and the convenience of the driver it would sell. A motor car in which the windscreen wipers are so ingeniously arranged that they only sweep part of the screen, so that when you turn to the left in rainy weather you suddenly become blinded—that does not seem to me to be a good selling point. A motor car in which you have to use two controls, the dipping switch and the clutch, with your left foot, and you sometimes need to use them both at once—that does not seem to me a good selling point either. A motor car in which as you drive along with your foot on the accelerator pedal your knee rubs continually on the knob of the window winder—that does not seem to me a good selling point.

MR. GARRY RICHARDSON: What is the attitude of workers to ergonomics? Would you allow time and motion study to be associated with ergonomics?

THE LECTURER: I do not think time study comes into it very often, except as providing a criterion of behaviour, but certainly motion study does. People talk nowadays about work study, rather than time and motion study, and 'work study' has proved immensely more popular than time and motion study ever were. The question of who is to be responsible for making the studies to adapt equipment and working methods to human needs is an interesting one, and I think that the work study people could do a very great deal if they were given some training in biological matters to help them assess human needs more accurately and effectively. I do not think it is a question of time study, which after all is something you undertake primarily for the purpose of fixing piece-rates.

MR. F. C. SHEFFIELD: I was very interested in the speaker's statement that the engineering psychologist can do much for the workman and for the operation of machines. That is certainly so. Among the factors which also need investigating are the psychology or the output of the operator of any machine and his reaction, maybe his prejudice, to any change which is designed for his comfort. Everyone knows that in the bad old days in the dark mills the operator, as a result of economic necessity, put his press guard out of action so that he could take risks and improve his output.

Speaking of motor cars: only a few cars in this country are now made with the gearcock change. When it was first introduced you paid about £10 extra for the privilege of having this convenience. We have an element of skilled finesse in car driving in this country which still persists from the early days. Possibly it derived from the finesse in handling a horse in the old days of horse carriages. It was commonly believed that only cissies wanted a change on the gear column, and all the real people who could really drive wanted a short lever on the floor. But while the gearcock change was standard people were prepared to pay an extra £10 to have a model specially adapted. Is there any movement afoot to study reaction and prejudice amongst operators?

THE LECTURER: Possibly the motivational researchers will tell you that they will give you the answer in due course. Well, perhaps they may, I don't know. But certainly prejudice is a very important feature, and not only prejudice but tradition and custom. Have you ever considered the fact that 'bus drivers have always sat when they were conducting their vehicles but tram drivers always stood? I suspect that is because the 'bus driver descended from the coachman and the coachman always sat, since the days of the Roman chariot anyway. The tram driver descended from the locomotive driver and the locomotive driver has always stood. I think probably that is the reason.

MR. ALAN R. WYLIE: I am fascinated by a point of detail in this question of people expecting things to go up when you turn a knob to the right. I shall never forget

seeing the late Professor D'Arcy Thomson draw a flower, or an animal, with two hands, as he was describing things. Very few of us are ambidexterous to that high degree. If you are faced with a control panel or something which one man is supposed to operate with both hands, what is the official attitude about the way in which a knob operated by the left hand turns?

THE LECTURER: I think the answer is that whichever hand you use you expect a movement to the right, a clockwise direction movement, to lead to a rise in something or a move of something to the right. I should say it is the direction of the movement rather than the muscular effort of the turn. I do not say this is universal; there may be some people who expect the opposite.

MR. G. M. WARRINGTON: I am left-handed. I should not think myself that you could possibly make all machinery to suit right- and left-handed people. One has to be flexible about this. There are some things which can be cheaply adapted and others which cannot. The argument is essentially economic. Before I came here this evening a work study engineer with whom I work pointed out to me that if one designs an expensive piece of electronic equipment which costs perhaps £10,000, in certain circumstances you would need to spend, say, £2,000 more to make it ideal, ergonomically speaking, for the operator. In fact, the ideal person to operate it would be a dwarf who had lost the sight of one eye. He then went on to make the point that if you could obtain such a person by spending, say, £100 on advertising, would that not be better than to spend £2,000 in adapting the equipment? In other words, if we accept that it is the duty of society to provide suitable employment for all its members, then it is arguable that we should select people who are not average to fit special needs, and that in some cases it is better to find people for machines than to fit machines to the people.

THE LECTURER: I quite agree with you that it is not possible to make everything so that it can be used equally conveniently by the left-handed and right-handed. You may have to have some jobs which can be done only by the right-handed. But not everything needs to be as awkward for the left-handed as it very often is. You cannot solve all the problems by selection, I am afraid. Nationally speaking we have got to make the best use of *all* our industrial manpower, and this means adapting equipment to human capacities and limitations. Anyhow it is extremely wasteful to rely only on selection; you may find someone who can work the equipment, but only inefficiently and at a high cost. It is very much better to make it simpler so that most people can work it effectively at a low cost.

MR. R. M. KAY: The speaker referred to cussedness. That after all is one of the basic elements of human nature and I think we have to cope with it in the design stage by introducing a certain amount of flexibility: by not attempting to design too perfectly for an ideal individual. Reference was made just now to the tram driver standing and the bus driver sitting. A more recent case has been the design of cabs for overhead cranes in which, in the old days, the operator had to stand and look over the edge. A seat was introduced to make it easy for him. Due to his cussedness and human nature it was found that he did not want to sit down all the time; he would like to sit down when he would like to sit down. Therefore the next stage was to put in a seat which would tip out of the way and controls which were suitable for operating in a standing position and equally suitable for operating in a seated position. I think this principle of sit/stand should be applied rather more than it is, because so much effort is expended in trying to plan exactly for the theoretical ideal.

It seems a sad reflection that Human Engineering has so far been financed mainly by people concerned with inhuman applications. I refer to the military side.

[Mr. Kay writes: "The above remarks were born in mind recently when designing drawing-office furniture. A sit/stand position was provided, with appropriate high stools. This has been very well received by draughtsmen."]

THE LECTURER: I entirely agree with you about the importance of this sit or stand question. There are a large number of jobs where the operator is obliged either to sit or stand the whole time when it is quite feasible and possible for him to choose to sit or stand. There is a lot to be said for the old high office desk, where you could sit or stand provided you had a suitably designed stool, but it has been swept away, and now the clerks sit all day whether they like it or not.

MR. HUGO BALL: An enormous amount of work is done not in factories or workshops or offices, but in the home, and the people who do it are the women folk. To what extent has this science been applied to the production of so-called labour-saving devices in the home? From the things I have looked at and bought, it seems, not at all. The height of sinks, the position of taps, the sizes of washing machines and various other items don't seem to be thought out. This important question nearly gave rise to a dispute between my wife and myself because we are of very different heights and we both like cooking. The height of the bench in our kitchen was the source of a great deal of discussion. This was luckily solved because of the age of the house: the floor slopes so much that a level bench top is at different heights at different parts of the kitchen!

THE LECTURER: There is a great deal to be done in many homes and in many kitchens. In the early stages of the war I remember taking a house which had been most elaborately treated by an interior decorator and designer. In the kitchen in one corner a hood had been put up to surmount a gas cooker, with a fan on top to take away the fumes. In the opposite corner on the same wall a larder had been built, with a recess underneath for a refrigerator. Now at that time all refrigerators had their doors hung on the right-hand side, and all gas cookers, with side-hung doors, on the left-hand, but the two erections were placed so that the doors had both to open away from the walls, making access very inconvenient.

There is great scope in kitchens and the domestic field for taking account of the capacities and limitations of people at work.

MRS. MARY ADAMS: May I congratulate Mr. Ball on raising this very important subject of women! I have been sitting here observing Dr. Frisby's specific avoidance of women's work and hoping another lecture could follow at which you, Sir, again would take the Chair, in which the ergonomic problems of the woman in the home would be explored. Perhaps I might also add, for Mr. Ball's information, that the Committee for the Scientific Management of the Home already exists; it is run by a voluntary organization. Women have a very great stake in the field that Dr. Frisby has so admirably disclosed to us this evening.

THE LECTURER: Dr. Lillian Gilbreth, the wife of the famous American time and motion study man, gave a great deal of time and thought to studying the problems of kitchens and she wrote a book on that subject; there is quite a lot of information available.

THE CHAIRMAN: On that very happy note we ought to close the discussion. May I end with a personal reminiscence of my own: on behalf of my wife I once did a little scientific research to find exactly how high the kitchen sink should be fixed for her. We got it all exactly right and then sent for the local builder. He measured the mark on the wall where we wanted to fix it and said, 'No, that will not do'. I asked why not; and he said, 'I always fix 'em at four feet six'. I insisted; he shook his head again, looked at me with deep disgust and said he would not be responsible for the consequences. I had to give him a written confirmation that I took the responsibility before he would proceed!

I am sure you would now wish me to take responsibility for another matter, and to propose a very hearty vote of thanks to Dr. Frisby.

The vote of thanks to the Lecturer was carried with acclamation and, another having been accorded to the Chairman, the meeting then ended.

SPORT IN THE COMMONWEALTH

A paper by

G. A. McPARTLIN,

Senior Technical Adviser, Central Council of Physical Recreation, read to the Commonwealth Section of the Society on Tuesday, 13th December, 1960, with Harold M. Abrahams, C.B.E., J.P., in the Chair

THE CHAIRMAN: Ladies and Gentlemen, you have not come here to listen to a very long-winded Chairman. Some of you may know the story of the late Lord Birkenhead, who was introduced by a chairman for 45 minutes, at the end of which he turned to Lord Birkenhead and said, 'I will now ask Lord Birkenhead to give you his address'. Lord Birkenhead said, 'My address is, care of the House of Lords', and sat down. I do not want that to happen here, but I must say really shortly what a great compliment it is to me to have been asked to take the chair for my friend Mr. McPartlin. I can think of no one better able to give this talk to you.

As I have promised to be brief it ill becomes me to give you a list of his qualifications for reading this paper. Moreover, you are to have the opportunity of seeing very quickly how suited he is to his task, so that no introduction of mine could be anything but superfluous. But he has had a life-long experience and interest in all kinds of sport—I might say both in war (towards the end of the war) and in peace—and has most ably filled the position of Senior Technical Adviser to the body which has done more than almost any other for British sport—the Central Council of Physical Recreation—for nearly 15 years. He has written—I will show it to you so you can all go out and buy it afterwards—a book called *Fitness for Sport*, which contains more commonsense within its pages than almost any book I have ever read. I do commend it to your attention. Finally, not only has he a wide experience of sport, but he has the additional distinction of having a son who plays Rugby for Oxford University, and while, as a Cambridge man, that grieves me, it is something of which he must feel justly proud—and a justification of his book, *Fitness for Sport*.

The following paper, which was illustrated with lantern slides, was then read.

THE PAPER

The Olympic Games have faded from the headlines but I feel sure they will never be forgotten by those who attended this fabulous festival of athletic endeavour. This year all roads did indeed lead to Rome. Whereas in 1896 the first modern revival of the Games attracted to Athens 484 competitors from 13 nations, in 1960 more than 6,000 competitors from 84 nations took part, and apart from the thousands who defied the torrid Roman summer to pack the stadia and other arenas, millions throughout the world followed the contest on television, sound radio and in the press—an indication of the magnitude of present day world interest in sport. Nor is this interest confined to the gladiators and the mob. Sport has become a matter for earnest consideration by politicians and educationists. In 1957 UNESCO published a study of *The Place of Sport in Education* to which 30 nations from both sides of the Iron Curtain contributed. During our last General

Election both of the major parties promised to find more money to develop British Sport, and after three years' work, the Wolfenden Committee has presented its report on *Sport and the Community* to the Central Council of Physical Recreation. The Report ranges over the whole field, but the recommendation that has captured popular imagination is that which advises the Government to spend £10,000,000 annually to remedy our sporting deficiencies. Many believe that a 'new deal' for British Sport is at hand.

In this climate of growing interest and speculation it is perhaps appropriate that we should take time this afternoon to look at sport not only in the United Kingdom but throughout the Commonwealth. What do we mean by sport? It is very difficult to find a satisfactory definition—the word has many connotations. How many would agree with the Hungarian contributor to the UNESCO study that 'Sport is a conscious and consistent effort with a view to providing and applying movement belonging to one or several branches of physical education with a tendency to improve results which can be numerically assessed', or with the Wolfenden Committee, which puts it more simply as 'any game—indoor or outdoor physical activity which is chiefly engaged in for the enjoyment and recreation of the participants. . . .?'

Although there seems to be very little enjoyment or recreation when we get to the level of competition where the Goddess of Success demands stern sacrifice of time and effort from those who wish to gain her favours, this definition is nearer to our concept of sport. Sport is something which people do apparently either for the fun of it or for the hell of it. It embraces both the purposeful activity of the dedicated athlete who gives all his leisure time to improving his skill in one specialized event and the carefree member of the Extra B XV who has no higher ambition than to work up a good thirst. If we are more or less agreed on that, let us now see how it all began.

Sport is as old as man—in the most primitive tribes whenever they gained a little leisure they filled it with games and dancing—usually related to fighting and hunting. The savage and warlike people who inhabited these islands were no exception, but the advent of Christianity, the discipline first of the Romans and then of the Normans, curbed the wilder excesses of the native Britons. Hunting in various forms remained a pastime of the nobility while archery and rudimentary forms of cricket, football, boxing, wrestling, jumping and weight-lifting as well as foot races were indulged in by the ordinary people. These pastimes were often barbarous and brutal by our standards. They usually took place on Church holidays—the only holidays they had. Some of these sporting activities associated with Church feast days have been carried on to the present day. For example, the mass football contests between the upper and lower ends of the same village or town, which originated in the Middle Ages, are still carried on in the Shrovetide Football Matches in Chester-le-Street, Durham, and one or two other English villages. This form of football is far removed from Wembley or Twickenham. It consists of a rough and tumble between all the young men of one end of the village and those of the other. The ball is propelled, carried, kicked or in any other way transported through the enemy territory to the goal at the far end. Shopkeepers wisely

barricade their windows during these violent encounters. These traditional games survived the Puritans' attempts to suppress them in the seventeenth century because they were sinful and ungodly, and the neglect of the industrialists in the eighteenth century and early nineteenth century whose indifference to the welfare of their employees allowed the latter to crowd into the cities where they lost both the space and time in which to play: a state of affairs which moved Goldsmith to write, 'Ill fares the land, to hast'ning ills a prey/When wealth accumulates and men decay'. And yet paradoxically it was the Industrial Revolution that saved sport in the end. For as the number of wealthy manufacturers began to increase they sent their sons to the rapidly expanding public schools. There they came into contact with traditional games and sports which were just beginning to feel the wind of change that was blowing through the whole of English life. Dr. Arnold, Headmaster of Rugby, was one of the first apostles of muscular Christianity who believed that games were good for character as well as for health, *mens sana in corpore sano*. At first these games continued to be almost barbarous by present day standards, but they were gradually civilized and the more violent and dangerous elements removed, often by verbal agreement between the captains before the game started. In soccer, for example, some schools continued to hack—which meant that they permitted players deliberately to hack the shins of their opponents—while others regarded this as foul play. 'To hack or not to hack' was the question often posed before the start of a match. As transport became easier, thanks to the opening of the railways, the schools began increasingly to play against each other, and the need for standard rules became pressing. Our Victorian great-grandparents, with their genius for organization and their devotion to discipline, brought their gifts to bear on the rough and uncouth pastimes of their country. All was reduced to order and this period marked the real starting point of modern competitive sport.

Between 1850 and 1900 a regular orgy of organization took place. In 1846 the first rules for soccer were drawn up at Cambridge University and in 1863 the Football Association was formed. It consisted mainly of clubs of old boys of public schools. In 1904 the International Football Federation was formed, which seven countries joined. To-day there are some 95 countries in membership including 15 from the Commonwealth. Oddly enough, although soccer has developed into perhaps the most popular international game in the world—200,000 watched the World Cup Final in Rio in 1950—none of the Commonwealth countries outside the British Isles have so far reached world class.

Rugby football, started, it is said, at Rugby School by a schoolboy picking up the ball and running with it—the most famous foul in history—did not have a governing body until 1871 and to this day it remains stubbornly British. It has taken little root outside the Commonwealth except in France. The great Rugby-playing countries are New Zealand, the home of the all-conquering All Blacks with their weird pre-match Maori war dance, the South African Springboks who are at present mowing down all opposition in Britain, and the Australians who manage to send over first-class touring sides in spite of sustaining no fewer than four versions of football.

Boxing has been practised in one form or another almost since history began,



[Australian News and Information Bureau]

The end of the Third Test Match at Sydney in January, 1961, when the West Indies beat Australia: young spectators invade the field in the hope of acquiring the souvenir of a stump or bail

but it was the discipline of the rules laid down by the Marquess of Queensberry in 1867 and the formation of the Amateur Boxing Association in 1880 that enabled it to become generally accepted as a sport.

Cricket, perhaps the most truly English of all games, has a history which can be traced at least as far as the year 1300—the game was played with the approval of authority or in the teeth of its determined opposition. The first recorded school match in 1796 between Eton and Westminster, played in defiance of the Headmaster of Eton, Dr. Heath, ended unhappily for the representatives of Eton—not only did they lose by 66 runs but the whole eleven were flogged by the Head on their return to school—whether for defying him or losing is not stated.

The M.C.C.—Marylebone Cricket Club—still regarded as the authoritative body for cricket, was formed in 1787 and published the laws of cricket the following year. But it was the invention of the grass mower and the introduction of the heavy roller in the second half of the nineteenth century that transformed cricket to the game as we know it to-day. In 1884 the M.C.C. renewed the Code of Laws and modern cricket was born.

Cricket, like Rugby, flowered chiefly within the Commonwealth, but because it can be played in hot climates it has developed not only in Australia, New Zealand and South Africa but in the West Indies, India and Pakistan, and all these countries exchange visits.

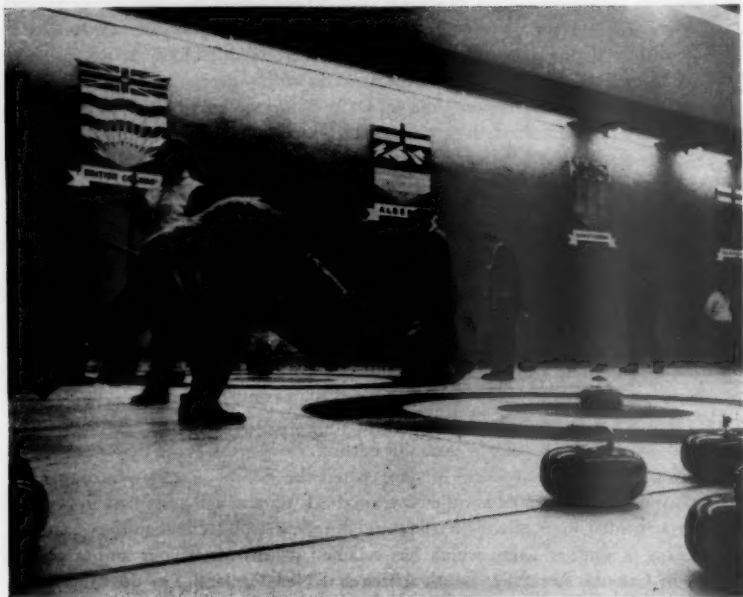
Athletics, which is really a collection of individual tests of strength, speed and skill involving running, jumping, walking and throwing, gradually evolved over the centuries. Pepys, the indefatigable chronicler, records foot racing in Hyde Park in 1660 and about the same time at Woodstock there was a mile challenge race for £1,000. In 1850 Exeter College, Oxford, formed an athletics club, in 1857 Cambridge University started its University Sports, followed by Oxford in 1860; in 1880 the Amateur Athletic Association was formed. I think it would be unfair if I did not record that the United States played as great, if not a greater, part in the development of modern athletics—especially in the field events. Almost every country in the Commonwealth now takes part in athletics, and in the Rome Olympics, 24 Commonwealth countries were represented—10 finishing among the medals.

Swimming, water polo and diving owe a great deal to our Victorian great-grandparents—the Amateur Swimming Association was formed in 1869—but again much of the credit for the evolution of modern techniques must go first to Australia, where the crawl came from, and to the United States and Japan.

Still dealing with traditional games, it is pleasant to record three games where Scotland took the lead—bowls, golf and curling. Bowls, the game that Sir Francis Drake was alleged to have been playing when the Armada interrupted him, has been played in one form or another for hundreds of years. But its first governing body was formed in Scotland in 1892 and England and Ireland followed suit in 1903. This is another game which has retained its British flavour and is played mainly in Canada, Australia, South Africa and New Zealand. On the other hand golf, which, in spite of some ill-founded claims from Holland, originated in Scotland, has become like soccer one of the few truly international sports. It was introduced to England by the courtiers of James I and the first golf club in England was founded at Blackheath in the early part of the seventeenth century. The governing body for the sport is still the Royal and Ancient Golf Club at St. Andrews in Scotland. But throughout the world wherever one can find grass and, one suspects, in a good many places where there is no grass, golf is played. The old Scottish game of curling—the ‘roaring game’ as it is called, because of the noise the stone makes sliding over the ice—has more followers in Canada and America than anywhere else in the world, although it has been taken up with enthusiasm by all countries catering for winter sports.

So much for the traditional games and sports, and I know that I have by no means exhausted the list. Let us now look at the second group, namely those which were invented in Britain and developed and were exported to the whole world. Perhaps the most dramatic of these is lawn tennis. It was invented by a Major Wingfield in 1874 and given the improbable name of Sphairistike. The original court was shaped like an hour glass and the M.C.C. at Lords and the All England Croquet Club at Wimbledon laid down courts for the amusement of their members. To this day the All England Lawn Tennis Club at Wimbledon—the home of the Championships—is officially the All England Lawn Tennis and Croquet Club.

Table tennis was invented by Mr. James Gibbs in 1889. Like Major Wingfield, he also invented a strange name—Gossima. Gossima changed its name to



A game of curling in Quebec

[National Film Board of Canada]

ping-pong and enjoyed a boom in the early part of this century, but it was only after the First World War when the name was changed to table tennis and the English Table Tennis Association formed in 1921, that the game began to spread throughout the Commonwealth and the world. In recent years Japan has been the leading country in table tennis.

Although canoeing cannot be said to have been invented by a Victorian, since canoeing was a means of water transport for primitive man, John MacGregor can be said to have started the modern sport of canoeing. In 1865 he designed and built a canoe which he called 'Rob Roy'—after a former chieftain of the MacGregor clan—and made a 1,000 mile journey along European rivers and lakes. This sparked off an amazing flare-up of interest. The Canoe Club (now the Royal Canoe Club) was formed in 1866 and canoeing is one of the most popular competitive sports and recreational pastimes in the world.

The origin of Badminton is shrouded in mystery. A peculiar game called battle-dore and shuttlecock had been played for many years, but one theory has it that it was army officers stationed in the East who invented the game of Badminton and, in this country, it was first played at Badminton in Gloucestershire. The Badminton Association of England was formed in 1893 and the game spread rapidly to Canada, Australia, New Zealand, South Africa and Malaya. Outside the Commonwealth



[High Commissioner for New Zealand]

Ski-ing on Mount Ruapehu, in the Tongariro National Park, New Zealand

the game is also played largely in the United States, Denmark and Japan. However, the present-day champions are nearly always Malaysians.

Rather in the same category as canoeing are ski-ing and tobogganing. The Victorians did not invent these pastimes—they merely realized their possibilities. Ski-ing and winter sports generally, from being the amusement of a few socialites in the Alps, have become truly international. Oddly enough, it was the Norwegians, whose country is of course the cradle of ski-ing, who introduced ski-ing to Australia in 1865 and to New Zealand in 1867. The Ski Club of Great Britain was not formed until 1903.

But the traffic was not all one way. There are a number of games and sports which originated in Commonwealth countries overseas and have been accepted throughout the Commonwealth and indeed the world. Perhaps lacrosse is the best known. This was a game which the French-Canadians discovered the Red Indians playing and, because the implement that the Red Indians were using looked like a bishop's crozier, they christened the game lacrosse and it is still often described as the national game of Canada, although I believe ice hockey, American football and basket ball have usurped it in popularity.

Polo was played for centuries in India, but in the 1850s British soldiers and planters played with the Indians and the game was brought back to Britain and from there has travelled to many parts of the world.

One sport invented in Australia which has become popular in other parts of the Commonwealth is motor cycle speedway. Speedway had a great following in this country before and just after the war, but in recent years has suffered something of a decline, although I understand it is on the upgrade once again.

Ice hockey is another sport which originated in its present form in the Commonwealth—in Canada where the first official rules were drawn up in Montreal in 1879. It has spread from Canada, first to Britain and then to many other countries. Canada dominated world ice hockey until 1936, when Great Britain won the Olympic title; since then the U.S.S.R. and the U.S.A. have been keen challengers of Canada for world supremacy.

I have not time to list all the sports and pastimes which have grown and developed side by side with the growth and development of the Commonwealth and, according to Professor S. L. Staley of the University of Illinois, no fewer than 200 out of some 250 games and pastimes played throughout the world to-day owe their existence in their modern concept to Britain and the British Commonwealth. The process has by no means come to an end and I am sure we can look forward to new games and sports coming to us from the new countries in Africa and elsewhere as they develop their cultural and social patterns.

In reviewing sport in the Commonwealth, one is made aware of the remarkable way in which the resources of the different countries and territories have contributed to the equipment required for the various games. It would be quite an interesting study to list all the raw materials and the parts of the Commonwealth from which they are produced and then to write down the games and sports which depend on these materials. One has only to think of leather, wool, rubber, willow, cork and, more recently, the man-made fibres such as nylon. And one must again pause and tip one's hat to the amazing Victorians who, side by side with developing and codifying the various games, designed—often by trial and error—equipment which has stood the test of time, although it was sad to read recently that one of the most famous British football boot manufacturers had given up because it could not compete with the continually changing fashion in football boots. Nor should we forget that it was the groundsmen, green-keepers and gardeners of Britain who have made grass, or turf, the ideal surface for so many of our games. I am quite sure that one of the reasons why cricket has not become more popular abroad is because of the difficulty many countries find in preparing and maintaining a large area of turf. I personally found it very gratifying on a recent tour of Continental sports centres (where I found that in general the grass was very much below the standard we would expect in Britain), to come to Macolin in Switzerland and see turf which would have rejoiced the heart of the groundsmen at Lords. When I complimented the director on its excellence, his reply was 'You are really complimenting your own country, because this turf is the result of our employing an English expert for a number of years who not only planted these grass areas but trained our staff in the art of maintaining them'.

But perhaps most important of all the ideals of sporting conduct laid down by the nineteenth-century pioneers which have stood up well to the passage of time is the rise in national feeling in international contest and the fact that competitors from widely differing social and cultural backgrounds are now participating. The spirit of sportsmanship—respect for your opponent, modesty in victory, generosity in defeat, strife without anger, art without malice, are accepted wherever sporting competitions are held. In these ultra-democratic days when we are told the last

gentleman has disappeared from our social stage, it is remarkable that a player guilty of ungentlemanly conduct is considered to be no true sportsman. At the Olympic Games in 1960 the loudest and most prolonged demonstration occurred when the vast crowd thought they detected one of the competitors in an unsporting act. The unfortunate offender was subjected to a storm of booing which lasted fully five minutes.

In concluding this part of my paper, let me quote from an article written by James Hamilton, an American basket ball coach, written in an American Physical Education magazine on his return from a tour of England:

The author was very much impressed with the self-discipline evidenced and by the rigid code of ethical conduct adhered to by the English athletes. Let no person assume that these people are not fierce competitors. (Really one has only to review the history of that small piece of real estate to dispel any doubts in reference to this matter.) Rather here is a basic difference between the United States and England in general outlook upon sport and the place of sports in society. The English in effect say, 'Look, this is a game and as such should not be so highly organized that some of the pure enjoyment of the activity is lost'.

However, being a practical people, they realize that games are played intelligently and beneficially only when certain rules and regulations are observed. Knowing the natural inclinations and desires of their young, they begin at an early age to instil the spirit of fair and honest play and to develop that self-discipline that is necessary to make such a system workable.

This contrasts rather vividly with the American practice of exogenous discipline applied through school officials, athletic coaches and paid game officials in an attempt to achieve the highest level of performance from each participant in the programme and which makes our inter-school sports highly organized activities. It is not the purpose of this article to attack or defend either of these philosophies but merely to recognize the differences that exist and to present them for the reader's information.

All parts of the Commonwealth have taken with enthusiasm to sports participation but naturally because of geographical, climatic and economic differences, different sports have flourished in differing degrees in each part. India and Pakistan are supreme in hockey, and doughty cricketers and polo players; Malaya dominates Badminton; Canada, ice hockey; South Africa, golf and bowls and boxing; New Zealand, Rugby; the West Indies produce cricketers and sprinters; Ghana boxers—one could go on through the whole Commonwealth, and we have already had encouraging signs that some of the younger brothers among the Commonwealth nations in Africa are already knocking on the door of international recognition.

But if each part of the Commonwealth has shown that certain sports have taken root and are growing healthily, in Australia we are seeing British sport in full flower. I can do no better than quote from an article in the *American Sports Illustrated*, published in the issues of 16th and 23rd May, 1960:

Australia is a sports-playing, sports-watching, sports-talking, altogether sports-minded country such as the world has never known before. . . . Though it is approximately the size of the United States, only 10 million live there, about the same as in Pennsylvania. When you then consider what the Australians have managed to do in the intensely competitive field of international sport against nations with huge populations, it simply staggers your comprehension.



[Central Council of Physical Recreation

Two members of the 1958 Nigerian Empire and Commonwealth Games Team

At the present time, for example, Australia holds the Davis Cup, emblematic of world supremacy in amateur tennis. In golf it holds both the Eisenhower Cup (the world's amateur team championship) and the Canada Cup (the world's professional team championship). It holds 'the Ashes', which means that its cricketers defeated England in their most recent Test match. In women's swimming all the world freestyle records are at present held by Australians, and its male swimmers have had an almost similar monopoly since 1956, the year of Australia's sudden aquatic renaissance. In track and field its women athletes are unrivalled over the shorter distances, and its men, since the arrival of John Landy in 1954 as the world's second sub-four-minute-miler, have moved out in front in the middle-distance events such as the mile and 1,500 metre runs in which the current world's records (3:54.5 and 3:36) were set by the truly amazing Herb Elliott.

And what an array of individual stars, along with Landy and Elliott, has burst forth!—Peter Thomson, winner of the British Open in 1954, '55, '56 and '58 . . . Frank Sedgman, that beautiful tennis player, won twice at Wimbledon . . . Lew Hoad, another two-time winner at Wimbledon, not to mention Ken Rosewall, Mal Anderson, Ashley Cooper, and Neale Fraser, who have in recent summers all won the United States championship and have made it four years in a row that an Australian has done so . . . the two Konrad kids, John, now 17, and Ilse, 15, who between them hold over a dozen world swimming marks . . . also in swimming, the two record holders for the 100-metre freestyle, Dawn Fraser and John Devitt, and that consummate stylist, Murray Rose, who won the 400- and 1,500-metre freestyle events in the last Olympics (1956). . . .

A fine climate, plenty of room, plenty of time, an inbred love of sports and the wish to excel in them, the lack of competing fields of interest, the worship of the physical idea which is part of a young country, the right pitch of support from one's family and friends, the splendid natural facilities, the relatively inexpensive cost of sport, the early orientation in school, the opportunity to develop in highly organized competitions—and added to these, good food for growing bodies and the natural desire of the people of a small nation to do famously in fields which command international attention and respect—these in combination are the amalgam which has made Australia the most vigorous sports country of all times. It doesn't entirely explain, though, the emergence of its super-athletes. If you add two other factors on which Australia places strong emphasis, it does. They are: extremely able coaching and plain hard work.

Whether these are the reasons or whether there are others which have not been suggested, Australia certainly leads the way as far as the Commonwealth is concerned. Incidentally, it is remarkable that such a small country is able to maintain no fewer than four different kinds of football: Association football, Rugby League football, Rugby Union football and their own peculiar form, Australian Rules, which is played on a field twice the size of a soccer ground, with 20 men a side, and which seems to be a combination of Rugby, soccer, Gallic football and basket ball.

Is competitive sport good for Commonwealth relations? When some 'incident' takes place in a field of play there is usually a newspaper reporter around to give it undue prominence or see that it hits the headlines—and occasionally there are severe rows.

One can recall the tremendous fuss about Harold Larwood's bowling during Jardine's team tour of Australia in 1928-9. It was even said that Australia had threatened to leave the Commonwealth unless Larwood stopped bowling 'bodyline'. No doubt feeling ran high at the time but no rancour was left behind. Larwood, who has settled down in Australia, was given a warm welcome when he decided to emigrate there. We have had bottle throwing in Trinidad and we have even had booing at Twickenham. But it is easy to get such events out of perspective and out of proportion. The very intensity of feelings aroused is an indication of the strength of the British interest in sport, and for every unfortunate 'incident' there are a hundred pleasant ones which go unrecorded and unsung. When Chris Brasher was at first disqualified in the steeple chase in the Melbourne Olympic Games, the competitor who was temporarily placed first said that he knew he was not entitled to the Gold Medal and was glad justice was done. The British team who were awarded Gold Medals in the relay race in the 1948 Olympics told their American competitors that they did not feel that they had won and were only too glad to hand them over when, in fact, the judges—having seen a film of the incident—overruled the decision to disqualify the Americans. Innumerable friendships have grown and developed during the tours of this country by the Springboks, the All Blacks and the West Indians, and when our teams visit the Commonwealth they return with glowing accounts of the hospitality they have received.

I should like to mention now what is undoubtedly the most dramatic evidence of the Commonwealth's interest in sport, given once every four years when the British Empire and Commonwealth Games are held. No one who was present at Cardiff could have failed to have been stirred by the spectacle of athletes from all

*[Central Council of Physical Recreation]*

Women's hockey: England v. Scotland at Wembley in March, 1952

parts of the Commonwealth parading at Cardiff Arms Park before the opening ceremony of the 1958 Games. Thirty-five countries of the Commonwealth competed. This is one of the few occasions when the idea of the British Commonwealth can be seen in a tangible form and when the feeling of a brotherhood of nations can be experienced. As Lord Beatty, Chairman of the Games Council, said in the concluding passage of the report of the 1958 Games:

As ever, a happy family relationship was soon established. No disrupting feeling of nationalism caused dissension. All were unitedly a common band of brotherhood, speaking the same language and acknowledging the same Queen as Head of the Commonwealth. All trained together, dined at the same tables in the Dining Halls, walked out together and were united at the Closing Ceremony and the Farewell Party as never before. At Cardiff the Commonwealth was one true entity before our eyes.

It is pleasing to be able to record that the member countries of the Commonwealth still look to Britain for a lead in sport. The second half of the nineteenth century saw the establishment of the governing bodies of sport. The second half of the twentieth century is witnessing the establishment of coaching schemes by the governing bodies—the appointment of national coaches and the training and examination of thousands of honorary coaches. The Football Association, the Amateur Athletic Association, the Lawn Tennis Association, the Amateur Fencing Association and the Amateur Swimming Association are among the bodies to

operate national coaching schemes. These have important repercussions throughout the Commonwealth. Not only are our national and senior coaches travelling to distant parts lecturing and demonstrating new methods and techniques, but students of coaching from all over the Commonwealth come to attend coaching courses in this country.

I hope I can claim without boasting that the Central Council of Physical Recreation has played a large part in helping to make these coaching schemes work, particularly by establishing and maintaining the three National Recreation Centres—Bisham Abbey, Lilleshall Hall and Plas y Brenin.

Sport in the Commonwealth is developing steadily, but both at home and abroad one sees that a great deal is yet to be done. Some day I hope we will be able to boast that no youngster in any part of the Commonwealth is deprived of the opportunity of developing his full sporting potential, of acquiring a love of sport and of finding, through sport, one way to a fuller life, for, with Sir John Wolfenden and his Committee, I believe that

a valuable element in the growth of individuals, especially young people, would disappear if games and outdoor activities ceased to be practised . . . the word sportsmanship means something important and valuable. . . . It is easy to ridicule the 'That's not cricket, old boy' attitude. But in its deeper (and usually inarticulate) significance it still provides something like the foundations of an ethical standard . . . it retains the notions of not simply keeping just within the letter of the law, and of avoiding action . . . which would infringe the rights and spoil the proper enjoyment of other people. This may seem a rudimentary form of ethical theory; but in hard practice it is no bad elementary guide to decent living together in society.

DISCUSSION

THE CHAIRMAN: I will be rather broadminded about questions, because strictly speaking a question should be short and end with a question-mark; but at this gathering if people choose to express briefly their views on the topic, I am sure we should be glad to listen to them.

I should like to start by asking Mr. McPartlin if he has formed any view as to why Canada, for example, has never really taken to cricket or to Rugby football. Is it perhaps the influence of its contiguity to the United States?

THE LECTURER: I think that to answer that question one has to do a certain amount of conjecture. I would say that the influence of America on Canadian sport is quite considerable. Oddly enough, it did take to Rugby Union quite enthusiastically and the history of American football is very interesting. The American football that you see to-day, on films and so on, is directly descended from Rugby Union. The first time American football became a competitive college sport was when either Yale or Harvard challenged one of the Canadian colleges and they agreed to play to the Rugby Union rules, more or less. That started inter-college competition. But under the influence of one particular gentleman whose name escapes me at the moment, the rules were modified year by year and about 25 years or so ago the forward pass was introduced. That really marked the big cleavage between Rugby Union and American football. The other factor was 'blocking' or 'checking' when a man is not in possession of the ball, which is a feature of American football. They now wear up to 30 lb. of protective armour when they are playing.

But Rugby Union did catch on in Canada and had it not been for certain United States influences they would probably have reached a very high standard. It is still played to some extent.

With the other sport you mentioned—cricket—I think climate and geography have something to do with it. It is played in British Columbia, but in other parts of the Dominion of Canada I think it is rather difficult to lay down really good cricket pitches. I honestly do not really know the answer to that.

THE CHAIRMAN: Maybe it is the influence of baseball?

THE LECTURER: I think perhaps baseball does play a part in it.

A MEMBER OF THE AUDIENCE: Do you think that cricket is a dying game in England?

THE LECTURER: There are some people who say that the past tense should be used there. I think I have heard a prominent athletics coach call it 'organized idleness'. There are a lot of different views on cricket. I would not say that it is a dying game at all. Certain levels—county cricket for example—are up against certain difficulties.

County cricket flourished in the days of greater leisure for certain people than we have to-day. Now we have not so much leisure for the so-called 'leisured class' and more leisure for the so-called 'working class', but not so much that it enables a man to go away for four, five or more days every week. I do not think that cricket is dying, it is changing its character. We may see some fairly drastic changes in it in the next ten years, but I would hesitate to say that it is a dying game.

MR. A. E. V. BARTON, C.B.E. (Secretary, West India Committee): The question of coaching is one of the most important things, but in the small territories of the Commonwealth it is very hard for games-players to get coaching because of the cost. Is there any sort of a move in this country to make it easier for places like the West Indies, for example to get coaching? I am at the moment arranging for a football coach to go out to Trinidad, but it is a very expensive business.

THE LECTURER: I cannot answer the question as to whether steps are afoot to make it easier for coaches from this country to go to other countries, but I would suggest that perhaps it is not altogether correct to say that it is necessarily an expensive business to get good coaching. I should like to refer—and this is an illustration from America—to the Tennessee Tiger Belles, the eight girls who virtually represented the United States women in the Olympic Games. One thinks of the Americans as being lavish with money, equipment and so on, but in fact that team came from one rather poor college in a comparatively poor State. They were trained by a man who is not a professional coach, in the sense that he is not paid for his coaching, but he was dedicated to the job. In order to equip themselves for Rome these girls got up at 5 in the morning and they practised; they practised in the heat of mid-day and they practised in the evening. Altogether it shows that money is not the only criterion of whether a coaching scheme is going to be successful or not. I do agree, however, that in order to get started some method should be adopted of enabling first-class coaches from this country to go to the Commonwealth and teach those who, in turn, will be resident there, and will train others.

MR. A. POWIS BALE: I am rather puzzled by the point at which ordinary sport finishes and games, or recreation, begin. You mentioned one particular instance—camping. A lot of camping could not be called sport.

Again, I should hardly call bowls a sport. Could you give some idea of the demarcation line between sport and games, and sport and just messing about?

THE LECTURER: I think I must pass that one! This is a debate that has gone on ever since the Central Council of Physical Recreation was formed. When we get applications from an organization which claims to be a sports organization or a recreational organization it is terribly hard to know. Fishing, for example, is one activity that often causes discussions. When a man is standing with a bit of bait on a line is he indulging in sport, or is he merely lazing away the day? I think Wolfenden had it: he said it is anything you do for fun, recreation and enjoyment. Quite honestly I cannot say where the line should actually be drawn.

MR. D. G. A. SIMMONDS: Much of Mr. McPartlin's lecture was on the status of the Commonwealth with regard to ball games. In this country how soon do you think we should think in terms of specialization?

THE LECTURER: Not too soon, is my feeling. I do not think it is a good thing—although I notice that if you are to hit the top at the Olympics and that sort of thing you have to catch them out of the cradle, especially at sports like swimming. On the other hand, I feel that there is something to be said for letting youngsters sample a fairly large number of games and sports—if possible—before they start specializing. It is a good thing to give the children an opportunity of practising not only things like athletics which, after all, they will have to give up when they are 20-plus, but also to become interested in games such as golf which they can play through the whole of their lives. There is more to it than merely success in competition, there is the recreational and the 'fuller-life' aspect of it as well. I should say that if you have a very gifted youngster who shows very great promise in a particular sport then a certain amount of specialization quite early is necessary if he is really going to achieve anything in world-class competition.

MR. SIMMONDS: May I come back on that? In a lot of schools to-day we seem to spend a tremendous amount of time getting boys, for instance, all to play football at a certain age. It is obvious that many of them are unsuited to that particular sport, whereas there are others in which they would be quite proficient. If we find a boy who is, let us say, particularly good at fencing, would it be advisable to let him continue with fencing? Should not our system of physical education tend more towards the individual and not so much the total class?

THE LECTURER: I think one has to consider this both from the achievement point of view and the educational point of view. A very distinguished professor said recently that the education process did you good in proportion to the amount of trouble you took to acquire the experience or the knowledge. I think on that ground the fact that a boy does not want to play football and is made to do so, may be doing him a lot of good. Especially because he is learning lessons of self-control and so on which are implicit in training for team games. There has to be a balance between what might be called the 'educational approach' and the 'fulfilment-of-the-youngster approach'—one must not lose sight of that.

I should say, though, that the tendency nowadays is to broaden the physical education programme as far as possible within the confines of the time-table and the equipment and facilities in the area. All trends and tendencies to-day are towards making the programme as broad as possible, especially in the later school years. That, on the whole, is a very good thing.

LT.-COL. D. S. LISTER, M.C.: In considering sport generally in this country one cannot disregard professionalism. I detest professionalism, and do you not consider that the approach to sport in the Communist countries is probably healthier than ours? I am not saying that it is so, but I think it is worth thinking considering.

In Communist countries there is no such thing as professionalism. When a performer reaches a certain high standard he is taken over by the State with a view to representing his country. One wonders if, taking a wide view of sport, that is not perhaps—and I stress 'perhaps'—a healthier approach than our mixture of amateur and professional sport, because there is no doubt that professionalism has a great influence on the sporting youth of this country. I wonder how you feel about that?

THE LECTURER: That is perhaps the most difficult one we have had yet, because there are so many things that require definition before you can answer the question: what do you mean by professionalism and what do you mean by amateurism? I have no personal, direct experience of life or of sport in a Communist country, but the impression one gets is that many of the things that happen to the selected athletes are very professional indeed. Their whole livelihood is more or less assured, and so on.

I think there is something to be said for giving everybody the opportunity of developing their potential to the full, and they should be given as much help as is necessary, but whether professionalism in this country is necessarily an evil thing I find it very hard to say. I can see certain evil aspects or circumstances. What I do feel is that those of our governing bodies who are concerned with amateur sport must, if they wish to retain amateur status in sport, get together and agree on certain things; and one thing they must be certain of—that they get rid of the amateurish methods that seem to have prevailed in certain governing bodies at administrative level. I say that with the utmost respect to my Chairman.

THE CHAIRMAN: I should like to add a word there, because this is a subject which is dear to my heart. Of course, professional sport is an industry—that is a wide use of the word. One has to remember that what the professional athlete—in the widest sense of the word—is doing is providing the public with entertainment, just as the actor is providing the public with entertainment. The reason that we have so many problems is that over the years many facets of amateur sport, so-called—that is to say where the people primarily are concerned with winning a championship, or with recreation—have reached such a standard that they also provide entertainment. The problem we have is how to balance the entertainment side with the recreational side.

Fortunately these problems of so-called 'amateurism' are really confined to so few individuals compared with the numbers that participate in sport that my attitude—and I have the good fortune to serve on a governing body—is that it would be much better if we did not get so het up about these particular problems. After all, the problem of amateurism is not really a matter of morality or principle, it is a matter of the conditions under which you are going to allow people to take part in the competitions you organize. If only we could abolish the word 'amateur' we should get very much farther in solving a rather difficult problem.

MR. NIGEL C. COOPER: Just to follow up your point, Mr. Chairman; I follow your reasoning and accept it. The only thing is that, as you have mentioned, it is a few individuals who are concerned in a few, individual sports, but unfortunately these are the ones that bring with them international prestige. And because we now as a country are becoming aware of international prestige in sport—which we were not beforehand—and because it is playing a major part in international good feeling, we must try to put our house in order. I think you rather begged the question over that. We really must attend to it.

THE CHAIRMAN: When you say 'put our house in order', just what do you mean? First of all, there is not just one house, there are several blocks of flats in the different sports, and my own considered judgement is that it is bad enough trying to solve the problem in one sport, let alone trying to solve it in all sports as the International Olympic Committee have tried, most ridiculously, in my opinion, to do. After all, if you regard it as a matter of administration then there is no reason to get heated about it. It is only when people think it is a matter of principle, so-called, that they get heated. It is not a very difficult problem. You should merely decide in your sport which activities engaged in by the persons taking part you will not allow. It is as simple as that. The amateur definition arose entirely from snobbery and class distinction. It was invented in the late 1860s by whom? By members of the Universities and the Services. It was invented by followers of rowing and athletics combined. Such snobbery existed that these early rules barred from competition 'mechanics, labourers or artisans'. As some of you may know, that rule actually existed in one of the rowing organizations up to just before the Second World War. Could anybody defend that? It is perfectly true that one wants to control the thing. In athletics, for example: I think you would ruin national athletics if you admitted payment throughout the competition.

MR. COOPER: I think we are speaking in terms that are rather complementary. That was the essence of the question from this side—that the Communist countries have this open competition amongst athletes in a particular sport, and would it not be better if we accepted this?

THE CHAIRMAN: You could do it if you accepted the Communist régime, but I do not suppose that the speaker is suggesting that. The reason you have no amateur problem in Communist countries is that you have no professional problem either. Your entertainment is provided by the Dynamos, for example, and the other Association Football teams whom we would regard as professionals. But what happens? You merely second them—since the State controls everything—from one thing to another.

MR. COOPER: I do not think the ideologies of the English Table Tennis Association could be called Communist, and yet they have quite comfortably passed over this problem, and professionals and amateurs compete together. In fact, the two terms do not appear in that sport.

THE CHAIRMAN: Yes, but they have a very different problem from some of the other sports. They have not got a tradition of some 100 years of amateurism which they have to overcome. I like what the Table Tennis Association people do. I think it could be done in all sports, but you have to convince people who have a long tradition behind them. If you put this up to the governing bodies you would be astonished at the opposition you would meet.

MR. COOPER: Is it on grounds of principle or rather on grounds of vested financial interest?

THE CHAIRMAN: In my view it is neither. It is on grounds of prejudice.

WING-CDR. C. L. BEAUMONT: Surely, Sir, that is not entirely true. Was there not the idea in many sports that a professional was a person who only did that and therefore had 24 hours a day in which to train; the amateur was a person who practised his sport in his recreational time and it was not very fair to put one against the other. I suppose the salient example of that is boxing, where a professional boxer who does intensive training for two or three sessions a day is able to box fifteen or twenty rounds and should not be matched with an amateur whose limited training only prepares him for three, three-minute, rounds.

THE CHAIRMAN: I think it was certainly snobbery that invented the original amateur definition.

WING-CDR. C. L. BEAUMONT: Only in certain sports.

THE CHAIRMAN: The definition as produced for the first time in 1868 has been the basis of most definitions in most sports.

WING-CDR. C. L. BEAUMONT: That may be so, but I think there was good reason in many sports for defining an amateur to ensure that those who had the same possibilities for training could compete fairly together.

THE CHAIRMAN: I should have thought the training was a very dangerous line, because certainly some of the so-called amateurs do as much training these days as any professional did in the past. I am not for one moment saying that you should have no conditions of participation in non-professional competitions—I will not use the word 'amateur', I think it is the danger. I am saying that the conditions should be based not on any high-falutin' principle, but on the practical aspect of what you are trying to control. For example, it is ridiculous that you should say somebody is not an amateur who wants to broadcast for money about his sport. It is those things that cause most of the trouble.

MR. COOPER: I should like to ask the speaker how far the C.C.P.R. have gone in formulating any recommendations based on the Wolfenden recommendations?

THE LECTURER: The Council is composed of many organizations and we have taken and are taking their views. I should say that an amalgam of views has been formed and this week there is a meeting taking place which will probably crystallize the whole thing, and we shall thereafter be sending something to the correct quarter. Do not forget that as soon as the report was published the Central Council sent a copy to every single Member of Parliament, so they were all put into the picture as rapidly as possible. I am glad I have a chance to make this point, because there has been an impression created by certain writers in the press that the Council is dragging its feet in this matter, and I should say that nothing could be farther from the truth. In point of fact considerable work has been done at C.C.P.R. headquarters, collecting information and views which have *got* to be considered—every organization which has membership is entitled to a view—and these are being summarized, analysed and will be sent forward within a very short time now.

MRS. V. M. BOURNE: May I ask about hockey, which the lecturer did not mention.

THE LECTURER: I am glad you have given me a chance to say something about hockey. Hockey is a truly amateur game, I think—if I may say so, Mr. Chairman—but in men's hockey in the Commonwealth, India and Pakistan are the two outstanding countries in the world, in the women's hockey field England is absolutely top. It is one of the few sports where we beat the world. The amazing thing is that the women's international hockey matches at Wembley now attract up to 60,000 and 70,000 female spectators, which is truly remarkable. It is even more remarkable to go there and listen to the peculiar noise they make!

MRS. BOURNE: What does the lecturer think about the Crystal Palace? Will it make a good place for games and sport generally? We do not know much about it yet.

THE LECTURER: Considering that we have been working on this for over seven years, I think I must say, yes. The L.C.C. are spending £2,500,000 on the project. They are trying to make it the best of its type in this country. I think we ought to realize that our sights in this matter are quite low. If you have travelled on the Continent, as I have recently, and seen the centres in Western Germany and elsewhere, you realize that this very fine scheme at the Crystal Palace is quite modest in comparison with what is being done there. But when it is complete there will be in the London area first-class competition swimming and diving pools, which we have not got at the present time, as well as facilities for training and competition in athletics, field games and a wide range of indoor games and sports.

MRS. BOURNE: It is too far away is it not? That is the whole trouble.

THE LECTURER: It may be rather far away, but considering there is none at all in the London area at the present time I would suggest that it is a big improvement.

THE CHAIRMAN: One of the troubles about this far-away business is that it is always far away for somebody wherever you put it. The disappointing thing about some of the modern youth—if they will take it from me—is that they will expect facilities on their own doorstep, irrespective of where the doorstep is.

I said at the beginning that we were in for a treat, and you do not need me to say at the end that we have had one. I am sure you would like me on your behalf to thank Mr. McPartlin for his most interesting, comprehensive and enlightening paper, and also for the admirable way in which he has dealt with the questions. I should like to mention one thing which occurred to me while he was talking; that is, the great danger—he did refer to it—of making too much of national prestige. That is the line which we all have to watch very carefully. I think the following true incident will illustrate best what a farce this 'nationality' is.

In Rome, in the 400 metres, there was a desperate finish between Kaufmann of Germany and a coloured American, Otis Davis. They fought neck and neck up the straight: Germans yelled their heads off; Americans yelled their heads off. In the end

Davis won; both of them beating the existing world record; both of them having the same time—44.9 secs. When all the tumult and the shouting had died I recalled that Mr. Kaufmann was in fact born in New York City and, but for the circumstance of his parents going back to Germany just before the War broke out, he would have been representing the United States.

I am told that to carry out my duties I should put what I know will be accepted with appreciation—a very warm vote of thanks to Mr. McPartlin.

The vote of thanks to the Lecturer was carried with acclamation and, another having been accorded to the Chairman upon the proposal of Sir Hilary Blood, Chairman of the Commonwealth Section Committee, the meeting then ended.

RAILWAYS IN OUR TIME

A Dr. Mann Juvenile Lecture by

CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

Wednesday, 4th January, 1961

The year 1961 does not see railways nearing the end of their long history—far from it. In the underdeveloped countries of the world, such as large areas of Russia, Africa and China, it is new railways that are being built, rather than roads, and railways will continue to serve us for a long time to come.

But great changes are needed if they are to be worked efficiently and profitably, and to provide the speedy service demanded by the conditions of our time. Human labour has to be cut down to the maximum possible degree, and with the introduction of more scientific methods, more scientific minds are required if we are to make the most of them. Most of us have loved the steam locomotive, with its impressive appearance, its graceful action, its loud voice and its almost human behaviour. But despite its proud record of service for well over a century, the steam locomotive will have disappeared from our tracks before many years have passed.

Adaptable though it is to a very wide range of duties, and although it is still capable of putting up quite a reasonable performance when in a run-down condition, the steam locomotive is an inefficient user of fuel. Because the expanded steam, after it has done its work in the cylinders, has to be used to provide a draught for the fire, and because of the shortness of its boiler, both power and heat are thrown to waste out of the chimney. In size our biggest locomotives have reached the utmost limits that will pass under bridges and through tunnels, and more powerful types therefore cannot be built to meet increasing load and speed demands. Worst of all, cleaning and firing steam locomotives—the only way of approach to driving—are dirty and laborious jobs, and because of the attraction of other cleaner and less arduous occupations, with regular hours, it has become so difficult to recruit labour for cleaning and maintaining steam power that its replacement has become both essential and urgent.

What is replacing steam? In a country like Switzerland, with vast resources of water power, but no coal or oil, the obvious thing to do has been to harness the rushing mountain streams, and to bring the water down pipelines into power stations in which massive water turbines coupled to generators produce high-frequency current in vast quantities. Thus the Swiss railway system has been completely electrified. In the United States, with its extensive oil production, it is the diesel-electric locomotive which now has swept steam almost completely from the rails. In Great Britain, with her immense reserves of coal, the ultimate aim must be electrification, with current produced in power-stations with coal-fired boilers—or at a later stage, no doubt, in atomic power stations—but it is because of the urgent need to replace steam that diesel locomotives and trains are



The world's longest non-stop run: 'The Capitals Limited' (since renamed 'The Elizabethan'), still steam-hauled on its 393-mile run between King's Cross and Edinburgh

being introduced in such numbers in this country, as an interim measure, for electrification is a very lengthy and costly business.

Because of the cost, British railway electrification until now has been confined mainly to suburban lines round big cities. Electric motors can start trains from stations far more rapidly than steam locomotives, and so suburban services, with their many stops, can be speeded up and trains packed more closely on the lines. There is no delay at terminals in running engines round their trains, and no lost time as with steam in taking water or cleaning fires of clinker. Thus a far greater mileage can be got out of electric trains and their crews than out of those worked by steam power. Another type of line which it pays handsomely to electrify is one with heavy traffic and also steep gradients, such as that between Sheffield and Manchester, where the working has been transformed, both by much higher speeds and the many fewer men needed to work the trains. But this has been at a very high cost; to find clearance for the overhead electric conductors it was necessary to spend over £4,000,000 in boring a new three-mile Woodhead Tunnel through the Pennines.

This matter of clearance is adding greatly to the cost of carrying out the electrification of the London Midland Region main lines from Manchester and Liverpool to London. For it has been decided to use for this and all other future British electrification alternating current at no less than 25,000 volts, which needs still more clearance between the overhead wires and the bridges and tunnels. To give this clearance, between 800 and 900 bridges over the line are having to be



The world's most powerful single-unit diesel-electric locomotive: the 3,300-h.p. 'Deltic', future standard type for the King's Cross—Edinburgh route

rebuilt between Lancashire and London alone. The older method of electrification, with low voltage direct current fed to the trains from a third rail, as on the London Underground lines and the great electrified system of the Southern Region, will remain as such and is the more robust of the two; but the high voltage overhead method, with alternating current, is the more economical in the end.

The most powerful of our electric locomotives, those now working between Crewe and Manchester, are of 3,300 horsepower. Only one diesel-electric locomotive in Great Britain is as powerful as that, and it is the famous 'Deltic'; but it has to be remembered that whereas the electric locomotive is drawing its power from the overhead conductors, the diesel locomotive is its own self-contained power-station. On test, the 'Deltic', which is to be the standard type of diesel for main line service between King's Cross, London, and York, Newcastle and Edinburgh, has whirled a ten-coach train up the whole of the long gradient to Stoke Summit, just south of Grantham, at an average speed of just under 90 m.p.h., and has easily reached over 100 m.p.h. downhill.

The majority of our diesel locomotives have electric transmissions; that is to say, the diesel engines drive electric generators, producing current which is used in traction motors to move the locomotive and train. This applies also to the hundreds of little shunters, which can work cheerfully round the clock, if necessary, and are far more economical in running costs than steam shunters. The only Region of British Railways which differs from the remainder in its diesel practice is the Western, which is now specializing in diesel locomotives with hydraulic transmissions; these cost as much as their diesel-electric counterparts but are lighter and more compact.

Diesel-electric or diesel-hydraulic locomotives are from two to three times as costly as steam locomotives of similar power, but this difference is largely compensated for by the fact that their running costs are lower (because they make more efficient use of their fuel), and that they can go on working continuously, at full power if needs be, for hour after hour, so that they can cover many more miles in a day than their steam counterparts. Also, if more power is needed with steam traction, two locomotives and two crews must be used, but two or more diesels can be coupled and all the controls carried through to a single crew in the front driving cabin.

Finally there are the smart diesel railcar sets, similarly capable of multiple-unit working, that have been introduced in hundreds all over the country. The fast and frequent even-interval services that these make possible, and their clean, bright and comfortable accommodation, have been such an attraction to the public that in many areas they have doubled or trebled the passenger traffic; in some areas, indeed, they have multiplied it up to five times. These trains have diesel engines distributed throughout their length, compactly arranged under the coach floors, and of such low power that mechanical transmissions, somewhat like those of road motor cars, are adequate; these units also are very economical in fuel and running costs.

As to main line passenger rolling stock, it is the unceasing effort to give the passenger greater space and comfort that has added so substantially to train weights and so has demanded steadily increasing locomotive power. Further weight is added by restaurant and kitchen cars, and by more substantial construction to provide safety and smoothness at high speeds, so that the modern weight of stock proportionately to the number of passengers carried is several times what it was in former years. In sleeping cars, with, say, eleven single bedrooms in a car weighing 37 to 40 tons, the disproportion is even greater.

The more generous loading gauge of the United States makes it possible to increase seating accommodation by building double-deck coaches; suburban services round Chicago are now worked largely with 'gallery' coaches, in which the ordinary seating at floor level is supplemented by seats in galleries along both sides of the central gangway, reached by stairs at both ends. On the main lines, especially those which pass through scenic mountain country—the Rocky Mountains, for example—many 'dome' coaches are now used, in which passengers can make their way to a first floor section, with magnificent views in all directions over the top of the train. The French use double-deck trains in some of their Paris suburban services, but an experimental double-deck suburban train built by the Southern Region of British Railways has shown that within the narrow limits of the British loading gauge such accommodation is too cramped for comfort; no further such trains are likely to be built.

Many modern developments are helping to increase freight traffic over the railways. Great Britain has been behind other countries in fitting its wagons with continuous brakes, like those of the passenger coaches, and this lack has greatly limited the speed of the slower freight trains, such as those carrying coal. But this problem is now being tackled with energy, and there are now many British express



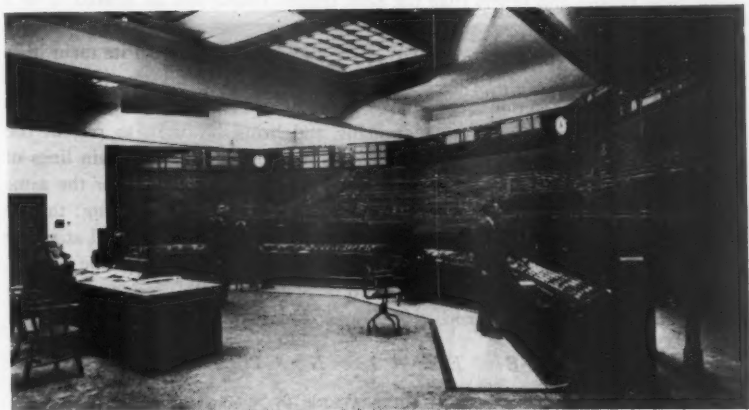
Modern mechanized marshalling of wagons: Temple Mills Yard, Stratford, showing descent from hump, with retarders in the foreground

freight trains, fully braked from end to end, being worked at speeds not far short of those of the passenger expresses. Such a freighter as the 'Condor', of the London Midland and Scottish Regions, accepts freight on containers at Hendon, in North London, up to the early evening, runs diesel-hauled non-stop over the 300 miles to Carlisle, where a brief stop is made to change crews, and guarantees delivery in the heart of Glasgow early the following morning.

Other freight developments are aimed at reducing manual handling to the minimum. The containers just mentioned are loaded at a manufacturer's works, carried by lorry to a railway yard and there transferred bodily on to a flat wagon, and at the end of the journey the same process takes place in reverse, so that there is no disturbance of the load on the way. In the freight depots where individual packages have to be handled, moving platforms are installed to save handling; other consignments are loaded on to small platforms called 'pallets', stacks of which are lifted by fork-lift trucks and thus transported bodily into and out of wagons.

Some of the greatest ingenuity has been devoted to the great marshalling yards where the miscellaneous wagons are sorted and made up into block trains running long distances. In these yards the work has been enormously speeded up by building artificial 'humps' over which the trains to be sorted are worked very slowly with the wagons uncoupled, and down the far side of which the wagons run at speed by gravity; the sequence of points giving access to the various sorting sidings is moved between wagon and wagon, and the correct braking is applied to each wagon to prevent violent impacts in the sidings, automatically by electric or electronic means.

With the increasing speed and density of the traffic the signalling must keep



The electric signal installation room at York, controlling the 33½ miles of track shown on the illuminated diagram

pace. As finances permit, the old semaphore signals are being replaced by colour-light signals, and, where the traffic is at its densest, by completely automatic signalling. The former massive arrays of signal arms at junctions are giving place to electric types of signals which are far more easy for drivers to see and understand as they approach. The heavy work of signalling manually by full-length levers at junctions and terminal stations is being done away with by signal control rooms, any one of which may replace half-a-dozen or more of the previous independent signal boxes.

In a control room such as the amazing installation at York, a single movement of a thumb-switch may, in a matter of seconds, set a road right through the layout, with all the relevant point and signal movements, that in former days might have involved the pulling over of a dozen or so levers in succession. Such installations are exceedingly costly, but what they mean in saving labour and speeding up the working needs no stress. To-day also we have junctions, such as those at Kennington and Camden Town on the Northern Line of London Transport, of which the working is entirely automatic. Into the programme machine there is inserted a roll, like that of a piano-player, which has had punched into it the entire sequence of train movements throughout the day, and electricity does the rest without any human intervention.

Finally there are the control systems devised to prevent trains from over-running signals at danger and so coming into collision. On electric lines such as the London tubes, with trains of constant weight running at a constant speed, it is a simple matter to instal trip levers, working in conjunction with the signals, which when necessary will cut off the electric current supply to a train, apply the brakes and bring it to a stand. On main lines, with trains of different kinds,

some fully braked and others (like the slow freight trains) not so braked, it is a different matter.

Many years ago the former Great Western Railway equipped all its main lines with train control apparatus which gives a driver an audible warning if he passes a distant signal at 'caution', and makes a partial brake application, the driver himself being left to take over the braking and bring his train to rest at the appropriate point. But the system now being installed all over the main lines of British Railways goes further. By electric induction it gives the driver the same audible warning, and also, straight in front of his eyes, a visual warning; this he cannot alter until the train reaches the signal box controlling the signal at which the warning was given. Thus, notwithstanding increasing speeds and traffic density, the railways still preserve the proud record of operating with greater safety than that of any other means of transport.

GENERAL NOTES

RABINDRANATH TAGORE CENTENARY: CELEBRATIONS IN BOMBAY

On 1st January, in Bombay, the All-India Bengali Literary Conference inaugurated a series of celebrations in honour of the Indian poet, artist and philosopher, Rabindranath Tagore, the centenary of whose birth occurs on 6th May, 1961.

In response to an invitation from the President of the Conference, Mr. Debesh Das, the Royal Society of Arts appointed its Honorary Corresponding Member in Madras, Mr. G. W. C. Garrould, to be its official representative at the Bombay celebrations. On the second day of the Conference, Mr. Garrould, who was one of some twenty foreign delegates present, was asked to deliver the inaugural address on Tagore's paintings; and on 3rd January he gave a broadcast, on the same subject, through All-India Radio. The following is the text of Mr. Garrould's address to the Conference, which was spoken in English:

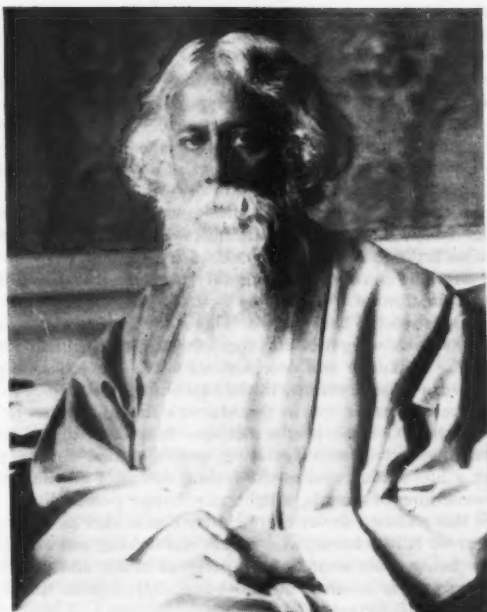
Mr. Chairman, Ladies and Gentlemen,

In asking me to give you this inaugural address I feel that you have done a singular honour to me and to the Royal Society of Arts whom I represent here to-day. I feel it is only fitting that I should tell you that we in Britain will be following with closest interest the Tagore Centenary Celebrations in this country. In the Birdwood Memorial Lecture on Rabindranath Tagore, which will be delivered this spring in London, we shall be listening to Professor George Catlin. At this Memorial Lecture it is my sincerest wish that we shall see many of you here to-day again in Britain.

This afternoon we shall devote our time to thinking about Rabindranath Tagore's paintings, which are I suppose best described as Expressionist, and yet which cannot really be associated with any conventional school of thought, for they express this great teacher's untrammelled thoughts, pure and clear, and undisturbed by artificialities.

The two feelings which seemed to me to dominate Rabindranath Tagore's works—not just his paintings, but his verse, his prose, his songs, everything that he left in legacy to us—are surely, simplicity, which has within itself a strange endearing quality, and brilliance, a brilliance of colour, of form and of movement which I find enchanting.

Often when we think of paintings there is one in particular which stands out in the mind's eye, and it is frequently a simple one: a simple painting, which of course has no name, for this great man would never speak about the subjects of his paintings, preferring instead to let the paintings, like his poems, speak into our hearts and minds for themselves.



[Keystone Press

Rabindranath Tagore in 1941, the last year of his life

This simple painting which I have in mind is of two strange long-necked creatures. One dominates the upper right-hand corner and seems perhaps the semblance of a giraffe with its long drawn profile, its tufted deep-set eyebrow, and underneath an intense and brilliant shining eye. In the lower left-hand, there is a similar long-necked creature, but its mouth is slightly open, and again there is the bright shining whiteness of its eye. These sombre silhouettes have behind them a pale green background, and at first one is perplexed as to the meaning of this curious ensemble.

There is, however, something distinct and vivid about this strange contrast, something irresistible and arresting and, to those of us who have lived in this great country, something strangely familiar.

It is a fact that in the very fabric of India, deep in all its culture, there pervades this same exciting theme of vivid contrast. Surely it is engendered by the intense brightness of the sunlight which, save for those few grey days of overcast monsoon, throws into relief colours and scenes so that they stand out in such detail, in such brilliance, that they are often too vivid and too intense for our western eyes fully to appreciate.

Rabindranath Tagore's paintings greatly influenced Indian painters, and continue to do so, and I call to mind a painting done by a very beautiful lady, also from Bengal, where on a background of vivid yellow three fish are swimming round and round as it were in ever-decreasing circles. The fish are bright. The ripples that they make pick up a hundred iridescent shades of colour from the sunlight. Is it not perhaps that these two scenes have at their root the vividness of a memory picture?

Sudha as a little girl is surely staring down into a pool of water left behind by the drying river. The fish swimming round and round in their ever-diminishing pool stir up brighter and brighter the yellow sandy bottom of the river until there is that all-pervading yellow colour.

Now as I look back again in my mind's eye at Rabindranath Tagore's strange creatures, I think I see a childish memory here. The green; it is surely the green grass of a little boy's lawn; and the creatures that face each other, one above and one below, are surely just silhouettes, because they are the shadows of two outstretched arms. The little boy is making shadow pictures, and now I see that deep-set eyebrow as the child's thumb, the bright eye is the glint of sunlight through the crack cleverly contrived between the fingers, and in the lower swan-like, or rather duck-like, head, the mouth is slightly open from the parted fingers of the little boy's left hand. Again that bright eye, that brilliant spot of sunlight chinking through between the fingers.

Now, in contrast, there comes to mind another painting. The painting first appears to be a great dark shadow of a man. The figure, again in silhouette, is this time sombre black against a sombre background. This is the grey monsoon contrast which is always not far away, showing here and there through the brilliant Indian fabric.

The whole picture is sinister and overcast and yet as one looks deeper, a lighter, brighter, silhouette can be seen shining in the heart of the dark black mass.

What now can we conjecture was in the Master's thoughts when he was working here upon this painting? I think it is a message. It tells us that beneath the dark forbidding frown, the severe, even menacing, profile of that strange person in the picture there lies a life, a soul; and as the feeling dawns, I see the bright and tiny silhouette with something of a smile, a light, gay, happy personality.

It is as though this painting shows quite clearly that within us all there is bottled up a person whom we hardly know, who guides our waking and our sleeping being, without our ever being truly aware of its presence at all, and yet those about us now in one moment now in another, our close friends, recognize this inner-self, and in their hearts they take it for our true self.

Rabindranath Tagore has surely, above all else, this delicious genius of making us conjure up for ourselves the thoughts he would evoke, in everything he did and said. His poems, his prose, even his conversations as we have them sketchily handed down to us by his closest friends, tell us that in this his genius was pre-eminent.

Let me for a moment read to you a picture. A picture in such simple words that in any language they must conjure up a scene of colour of such brightness as to be almost astonishing, and yet these words are so simple that they do not spoil in passing from one language to another:

A girl alone,
At the evening hour,
Walks through the fields.
On all sides of her the golden rice has ripened,
On her face the evening glow has fallen;
Light glitters on her hair.

To those of us with town-accustomed eyes there is a breath of such exquisite freshness about this evening scene, that we can almost feel it about us. It makes us want to screw up our eyes against the ruddy glow of that bright setting sun.

This is a picture set in words so simple and yet so brilliant that we cannot turn away. Yet he did not always portray the beautiful, the melodic softness, the happy side; he saw about him viciousness and cruelty, and wrote with searing scorn against the vices of his time.

In floods and storms, the pictures that he tells us can be terrifying in their realism:

. . . the lightning rips the clouds
Hurling through empty space its crooked
spears of sharp-edged laughter. . . .

Each phrase a picture, each thought here brings with it the shiver of the storm.

This is the essence of true genius, that it can make each one of us an artist in his own imagination. Little wonder therefore, that this great teacher would not talk about the themes behind his works.

Whether he is telling us a picture or whether he is painting one, his smooth flowing thoughts convey that there is a challenge for us to observe. These paintings, these themes are the challenge, and we have to struggle to unravel, to imagine, to understand, and in each one of these there lies some message that we on our own have to search out and to find.

No hints, no titles, nothing; just the challenge for each one himself to meet. The colours tell the brilliance of the Indian scene, the sombre darkness, the shadows, the very obscurities of our lives and minds.

The silhouettes—are they here and there the flashbacks to a remembered scene of boyhood turned to mature thought by the imaginative eye of someone who, it now appears so evident, could take all the tools of sight and rhythm, melody, colour and line, and work them with the same deft hand to suit the purpose of his mind?

I shall not speak about the technicalities of painting for there are amongst us here this evening those far more competent than I to delve into such deep and thoughtful matters, but in this brief moment which I have had with you, I hope that in some tiny measure I may have added just a thought or two to guide those who may wish to think along these lines.

In concluding this brief inaugural address which introduces the evening's dissertations upon this great man's paintings, I want to say how very deeply honoured I have felt to be asked to come here and speak to you.

The Society is co-operating with the Royal India, Pakistan and Ceylon Society, the East India Association and the Royal Commonwealth Society in planning a number of activities to commemorate the Tagore centenary in London during May. As Mr. Garrould mentions, the Society's Sir George Birdwood Memorial lecture will itself be devoted to Tagore. Details of this event, and of the arrangements being made by the other interested Societies, will be announced in the *Journal* in due course.

TOULOUSE-LAUTREC AT THE TATE GALLERY

This is the largest general exhibition of Lautrec's work to have been seen in London. There have been others that were fuller—for example, those collected ten years ago to mark the 50th anniversary of his death—but, though one may regret the absence of particular paintings, the present exhibition covers every period of the artist's life. That all but 18 of the exhibits come from Albi will itself be of interest to those who have not visited the Lautrec museum there and may be unaware of its riches.

In his introduction M. Edouard Julien, the museum's director, looks back to the reception that London gave the artist's show at the Goupil Gallery in 1898. His quotations from the press of the day effectively suggest a period *This England* but do nothing to serve a reassessment of Lautrec at this distance of nearly three-quarters of a century. But perhaps there remains nothing fresh to be said?

Satanic, bestial and crapulous were three of the milder terms used to describe Toulouse-Lautrec in his lifetime. Indeed, his grotesque appearance, his eventual alcoholism and his abhorrent subject matter remain, one must presume, the essential reasons for the continued interest shown in him by the popular press, the cinema and television. Yet it has been said—by Tristan Bernard—that Yvette Guilbert's 'little monster' was no more than a completely free being. The resilience with which he faced up to his personal tragedy—the crippling deformation that followed two accidents in his middle teens—was truly remarkable; his good humour and sense of fun were unforced and infectious; his appetite for life and company insatiable. Was this perhaps the final gift of his patrician background? Was his acceptance

of his lot, and the body of work he left behind him, made possible by that same sense of total assurance which informed the games and disguises of his somewhat eccentric father? Had the assurance been anything less than total, self-pity would surely have crept in—and self-pity, as entirely as any other sentiment, is absent from his view of the world. Lautrec remained curiously detached from the life he appeared to embrace so completely. His observation is dispassionate and objective, apportioning neither approval nor disapproval, neither pity nor blame.

To an equal degree he remained detached from the main stream of artistic theorizing and group activity of his day, while led by instinct to work wholly in the spirit of the period. His art was formed by the Japanese print, by his admiration for Degas, and by the loose touch and high key of impressionism. From the first he learned the flat patterning and linear arabesque that were to run through *art nouveau* and its allied manifestations; in Degas he responded to the compositional tricks taken over from the snapshot and that same participation in the realities of everyday life about which his own art was to revolve; from the impressionists and post-impressionists he took his handwriting—and the word seems peculiarly appropriate to that flexible shorthand of small, loose strokes which so lent itself to quick notation and improvisation in thin paint on unprimed strawboard.

A hundred period mannerisms bind Lautrec inescapably to his time: to Munch and Hodler, Ensor, Bonnard, Gauguin, the Beggarstaff Brothers. Nevertheless, he remained an independent figure. He set himself no problems of space or lighting; form as such did not interest him; his composition was casual. Human beings alone aroused in him that intense curiosity which is the mainspring of creation, and his analysis of character was more profound than anything achieved by his contemporaries.

With what tenacity did he pursue his quarry. Oriental indeed was the prolonged observation which preceded an apparently summary sketch. Emile Bernard gave 33 sittings for his portrait; Joyant posed more than 75 times for his. Half a hundred visits to a cabaret might be necessary to fix in the memory with precision some revelatory gesture, the exactly splayed awkwardness of a limb, a significant characteristic. How tenderly, how lightly, that delicate, wavering touch alighted on a grimace, a sagging jaw line, a mascara-ed lid. Lautrec's eye for movement is apparent in his very earliest studies of horses done in his 'teens. It remained, like his draughtsmanship and his visual memory, supreme. It enabled him, when he came later to study the human figure in circumstances lacking the normal constraints, to record it with a precision that conferred dignity upon its every aberration.

MICHAEL MIDDLETON

MOTOR CARS FOR THE QUEEN'S VISIT TO ITALY

Though details of the designs have not yet been disclosed, it is worthy of remark here that the bodies of the special motor cars which will be used for Her Majesty The Queen's visit to Italy next May, are being built at the Turin firm directed by Signor Pinin Farina, who in 1954 was appointed by the Society to the Honorary Distinction of Royal Designer for Industry.

RAILWAY MODERNIZATION CONFERENCE

The Institutions of Civil, of Mechanical and of Electrical Engineers are jointly organizing a 'Railway Modernization Conference' in London, on 3rd and 4th May, 1961. The proceedings will include five papers on the different engineering aspects and achievements of the British Railways modernization programme. Fellows of this Society who would like to attend should obtain further details and application forms from the office of the Institution of Civil Engineers, Great George Street, Westminster, where the Conference will be held.

OBITUARY

We record with regret the deaths of three Fellows of the Society:

SIR KENNETH HARPER

Sir Kenneth Harper, who died on 21st January, aged 69, was Chairman of the Burmah Oil Company from 1948 to 1957. In addition to his work in Burma for the development of the petroleum industry, he most capably discharged a number of important public responsibilities. He was a Member of the Council of State in India from 1928 to 1932, and in the following year served as delegate from Burma to the Joint Parliamentary Committee on Indian Constitutional Reform. He had previously represented Europeans in Burma at the 1931-2 Burma Round Table Conference in London.

Sir Kenneth was knighted in 1936. A founder member of the India, Pakistan and Burma Association, he was Chairman of its Executive Committee from 1942-4. He became a Life Fellow of this Society in 1935.

SIR STANLEY SPURLING

Sir Stanley Spurling, C.M.G., O.B.E., who died on 10th January, aged 81, had for many years played a leading part in the affairs of his native Bermuda. He was elected a member of the Bermudan House of Assembly, in succession to his father at the early age of 21 and, with a short interval, held this seat until 1942, in which year he was appointed to the Legislative Council. He had previously served two terms on the Executive Council, from 1914-20 and again from 1925-31. He contributed much to the success of the Empire Parliamentary Conferences held in Bermuda in 1932 and 1944. It was at his suggestion that representatives of the American Senate and House of Representatives were invited to attend the 1944 Conference as observers.

In his efforts to promote the prosperity of Bermuda and the development of its communications, Spurling was well aware both of the importance of maintaining close links with the mother country, and of the proximity of the United States, where he gained some of his earliest personal experience of business. He was a prime mover in the arrangement, made after the First World War, whereby the shipping firm of Furness, Withy undertook to provide a regular service to and from Bermuda, and had a similar share in bringing about the later agreement with Pan-American Airways. In 1938 he was Chairman of the Colonial Customs Conference held in Bermuda, and the following year presided in a similar capacity over the Conference held in Jamaica.

Spurling's own business activities and interests were extensive. He had been Managing Director of the Bermuda Electric Light, Power and Traction Co. Ltd., President of the Bermuda Fire and Marine Co. Ltd., and of the Salisbury Construction Co., and a Director of the Bank of Bermuda and of the Bermuda Telephone Co. Ltd. He had for long been a most active supporter of the English-Speaking Union and of the Royal Commonwealth Society. He was Chairman of the Bermuda Branch of the latter until last year, when he was elected Honorary Patron. He became a Fellow of this Society in 1947.

MR. ERNEST THESIGER

Mr. Ernest Thesiger, C.B.E., who died in London on 14th January, aged 81, was an actor whose highly personal interpretation of Comedy delighted English audiences for many years. Sprightliness, imagination, a pleasing degree of the non-sensical in an otherwise patrician manner and appearance, combined with an unerring sense of style, were qualities on which he drew with assurance and repeated success.

He came to the professional theatre by way of Marlborough College and the Slade School of Art, and had his first engagement as an understudy at the St. James's

Theatre, then under the management of Sir George Alexander, in 1909. Though he subsequently appeared in plays by Shakespeare and Wilde, however, Thesiger's powers had hardly been displayed before the outbreak of the First World War. His service in that conflict being cut short by a wound received in France early in 1915, he was able later that year to take the part of Bertram Tully in a popular farce (a genre he could elevate simply by his presence), *A Little Bit of Fluff*, which enjoyed a very long run. In 1920 he was cast as Cameron, the ghillie, in the first production of Barrie's *Mary Rose*, and his management of this tricky part attracted wide attention. His next performance, in the entirely different rôle of Arnold Champion-Cheney in Somerset Maugham's *The Circle*, added a new dimension to his growing reputation, and thereafter he was well established in public favour. Of the many different plays in which he subsequently appeared, the original productions of several by Shaw, and revivals of works by Shakespeare, Marlowe, Wycherley and Sheridan, may with justice be singled out as indicating the quality of his gifts. In the first group, it should be recalled that he 'created' (and several times repeated) the parts of the Dauphin in *St. Joan*, the Foreign Secretary in *Geneva*, and Charles II in *In Good King Charles's Golden Days*; and in the second, that he was memorable as Polonius, Malvolio and the Melancholy Jaques, as Piers Gaveston in *Edward II* and Mephistophilis in *Dr. Faustus*, as Mr. Standish in *The Country Wife* and as Lord Foppington in *A Trip to Scarborough*. The last was a favourite rôle.

From the early 1930s onwards Thesiger also appeared in a number of films; though his opportunities might be limited by the material, he always made an impression: particularly, perhaps, by the quality of pathos which he brought to the portrayal of the Baron in the screen version of Stefan Zweig's novel *Beware of Pity*.

Thesiger was an accomplished painter and a skilled practitioner of embroidery, on which subject he published a book in 1945. He took the chair at a meeting of this Society in November, 1946, when Miss Kay Kohler spoke on 'Embroidery as an Expression of National Characteristics'. He became a Life Fellow in the following year. He was made C.B.E. in 1960.

NOTES ON BOOKS

BRITAIN'S SCIENTIFIC AND TECHNOLOGICAL MANPOWER. By George Louis Payne. [Stanford (Calif.), Stanford U.P.] London, Oxford University Press, 1960. 45s net

About six years ago the National Science Foundation, which is the Federal agency in the United States appointed to promote basic research and education in the sciences, prompted a study by Mr. Nicholas de Witt of education and training systems in the U.S.S.R., which, under the title of *Soviet Professional Manpower* was generally recognized as the most authoritative source of information in this field. In 1957 the President's Committee on Scientists and Engineers, whose task was to assist the Foundation in many aspects of its work, asked for a similar survey to be carried out of technological manpower and education in Great Britain, of which the results are incorporated in this book.

The reasons for this interest in the scientific manpower resources of other countries are not disguised. Mr. Payne puts the American view succinctly when he says in his preface that 'the vigour of scientific research and the effectiveness of its application not only are of economic importance, but have become one of the determinants of a country's political effectiveness and a factor in foreign policy', and he quotes from the second interim report of the President's Committee that 'for purposes of national defence the greatest strength for the United States lies in the integrated resources of ourselves and the free world nations'.

The subject-matter of Mr. Payne's book goes considerably wider than its title indicates, since it includes a detailed survey of our secondary and higher educational

system, as well as a chapter on expenditure on research and development and some interesting comments on the social effects of present educational policies. As regards the latter, opinion in this country will hardly accept Mr. Payne's view of the effect which democratization of the universities is having, and will continue to have, on our social structure. His picture of the decline of the old ruling upper class, and its replacement by 'an ambitious, unpolished and rather insecure' managerial class having 'a burning disapproval of labour' seems over-drawn, and more than a little outmoded.

But this is only a niggling criticism of a book which contains an astonishingly thorough and detailed examination of our scientific and technical manpower resources and needs, and of our secondary and higher educational system. Most, but not all, of the factual information provided is available in official publications of one kind or another, but nowhere, so far as this reviewer is aware, has the material been drawn together, and the historical development of the subject been presented, as it is in this book. It includes, for full measure, a guide to all references and a very useful bibliography. As the author took the precaution of submitting his factual material to the Government Departments and authorities concerned, it may be assumed to be free from the inaccuracies which mar so many studies of this kind.

In the early part of his book Mr. Payne reminds us that, in proportion to its working population, the United States has many times the number of university students, and twice as many qualified engineers, as we have in this country: the proportion of qualified scientists is about the same. Later, in his chapters on the secondary schools and the universities, he makes some interesting comparisons between educational standards in the two countries. The grammar-school sixth form he describes as 'a post-graduate secondary school that has no American counterpart', and makes it roughly comparable to the first two years of a four-year American university course. He also finds it 'not too difficult' to accept the view that the British first degree, and especially the honours degree, is at least equivalent to the American master's degree. Viewed in this light, comparisons between the number of qualified scientists and engineers here and in the U.S.A. must clearly be treated with a good deal of caution. It is significant that recently published accounts of surveys in the two countries of the employment of technicians, that is men of sub-professional level, in the engineering and chemical industries showed that in the United States the ratio of scientists and engineers to technicians was about 14:9, and in Great Britain about 1:4. One can hardly avoid the conclusion that many of those whom we call technicians are deemed capable of doing work which in the United States is done by qualified engineers.

Mr. Payne is to be congratulated on a most comprehensive and always sympathetic examination of his subject. This is the kind of book which cannot long remain up-to-date, but it will be well worth revision in a few years' time.

J. M. V. S.

INTERNATIONAL INTERIORS AND DESIGN. *By Clive Carney. [Sydney & London,] Angus and Robertson, 1959. 84s*

IMPACT OF DESIGN. *By Clive Carney. [Sydney,] Lawson Press, 1959*

Both these books were published in Australia in the same year, which throws an encouraging side-light on that great country's interest in the subject of design.

Mr. Carney in his preface to the first book admits to having travelled thirty thousand miles through fifteen countries in search of the material for it. The publisher's note in the second book puts up the ante to forty thousand miles; even at the lower figure one cannot but admire the author's perseverance. Mr. Carney goes on to say that 'the variety of styles and the diversity of the interiors make unanimous agreement on their merit impossible'. He is indeed right, but in the opinion of this reviewer

it is a variety of quality within the various styles that is the most daunting feature of both these lavishly illustrated picture books.

In *International Interiors and Design* ten men and women, eminent in some aspect of the subject, each contribute a short article illustrated by a few photographs presumably of its author's choice. In the remainder of the photographs of this book and in all of the other, no consistent standard of taste is discernible; good, bad and indifferent are included in a bewildering kaleidoscope.

Since the war the best international interior design has developed certain characteristics—a purity of expression, an absence of complication and contrivance both in its architecture and its loose furnishings, the extensive use of natural materials and textures, a preoccupation with quality and, above all, the clever exploitation of space. These characteristics all contribute to the serenity which is inherent in all first-rate modern interiors, and this is a quality which has derived to some extent from the best Japanese interiors, from an appreciation and application of their use of space—though not necessarily of their detail. This calmness itself provides a sympathetic setting not only for people but also for works of art, which are regaining their importance in the modern interior.

Inevitably, along with this trend towards serenity, there is a swing away from the fashionable cosmopolitan decorator's interior—strongly traditional, softly luxurious, cluttered up with second-rate objects. These, deprived of colour which is perhaps their only redeeming feature, are to modern taste arid and boring. The criticism of these two books could be that they contain far too many such interiors, themselves of widely varying quality; that with a few notable exceptions, such as the admirable rooms for which Florence Knoll is responsible, far too little emphasis is given to the best modern work.

In the opinion of the reviewer, no book on design and interiors could be complete without reference to the work in the United States of Alexander Girard. He has evolved an idiom which is entirely personal, original and poetic, depending on adventurous colour and the brilliant arrangement of groups of objects, all of them meticulously considered and of great individual interest.

One last criticism: neither of these books is provided with an index, and in some cases it is virtually impossible to discover the designer responsible for the interior illustrated.

But it is only too easy to be critical, and there can be nothing but praise for the amount of loving care that has gone into the production of these books. If the intelligent interest of a few people is stimulated by them, as indeed it cannot fail to be, they will be greatly worth the effort.

R. D. RUSSELL

THE AEROPLANE. *An Historical Survey of its Origins and Development.* By Charles H. Gibbs-Smith. London, H.M.S.O. (for the Science Museum), 1960. £1 15s net

In its fifty tumultuous years of active life—and in the 100 years or so which preceded them—the aeroplane has gathered history at a rate and in a manner which is, undoubtedly, unique in technology. It has also had the fortune of finding a chronicler—in Mr. Charles Gibbs-Smith—whose diligence in research and enthusiasm for aircraft history is quite unsurpassed. As a result of the peculiarity of the vehicle and the industry of its historian we now have an historical survey of the evolution of a new means of transport and of war, which will certainly become a classic of its kind.

Mr. Gibbs-Smith sets out to survey the story of fixed-wing flight from early mythology to the verge of manned Space-vehicles. In addition to a chronology of the aeroplane's evolution—primarily in Britain, in the United States and in France—Mr. Gibbs-Smith has performed a valuable service in his 'commentary' section in which he examines the origins of such contributory elements to Aviation as the kite, the rocket, the parachute and the aero-engine. He follows these with informative

essays on subjects of primary importance in the study of aviation history, of which those on Leonardo da Vinci, Sir George Caley, the Wright Brothers and Anthony Fokker are significant examples.

Mr. Gibbs-Smith's enthusiastic research has not only provided much new data about the work of these pioneers, but has also corrected a number of hoary old misconceptions. And, indeed, so much has come to light during the ten years of preparation of this book that Mr. Gibbs-Smith has had to add a substantial addenda section. Among the data thus set out is a fascinating 'first eye-witness account of a powered aeroplane flight', discovered—of all places—in an obscure magazine called *Gleanings in Bee Culture*, published in Medina, Ohio, in January, 1905. The aeronautical description comes under the heading, 'What hath God wrought', and tells how a Mr. A. I. Root travelled nearly 200 miles to see the Wrights fly at the Huffman Pasture on the afternoon of Tuesday, 20th September, 1904.

Mr. Root's account concludes:

When Columbus discovered America he did not know what the outcome would be, and no one at that time knew; and I doubt if the wildest enthusiast caught a glimpse of what really did come from his discovery. In a like manner these two brothers have probably not even a faint glimpse of what their discovery is going to bring to the children of men.

The early hopes of the Wright Brothers can to-day be compared with the advances in Aviation which have brought about the fact that more people now fly the Atlantic in a year than cross by sea. Sixty years on, no doubt, our early advances into Space will provide no lesser contrast.

Mr. Gibbs-Smith is at his best in describing and commenting on the happenings of that decade of aeronautically 'Golden Years' between 1903 and 1913. Indeed, one of the services to history which he performs is to establish, and to document, the dates on which a number of important historical events in Aviation occurred—some of them previously confused or unknown. Among the dozen most important are:

1852 or 1853. First man-carrying flights by an aeroplane (Cayley's Glider).

17th December, 1903. The first powered, sustained and controlled aeroplane flights in history (Wilbur and Orville Wright).

October-November, 1906. First powered flight in Europe (Santos Dumont).

14th May, 1908. First passenger flight (C. Fuhrman with Wilbur Wright).

8th July, 1908. First woman to fly as a passenger (Mme. Peltier with Delagrangé).

8th October, 1908. First Englishman to fly as a passenger (G. Brewer with Wilbur Wright).

16th October, 1908. First powered flight in Britain (Cody).

December, 1908. First Briton to become a pilot (Moore-Brabazon).

April, 1909. First Briton flies in Britain (Moore-Brabazon).

25th July, 1909. First Channel crossing by aeroplane (Blériot).

March, 1910. First woman to become a pilot (Baroness de Laroche).

October, 1911. First use of aeroplane in war (reconnaissance by the Italians against the Turks).

Altogether Gibbs-Smith on *The Aeroplane* is to be highly recommended as a comprehensive commentary on the enthusiasms and successes, the oddities and the foibles which, taken all together—for better or for worse—have brought Aviation to its present state of development.

PETER G. MASEFIELD

GREAT AIRCRAFT. By Norman Macmillan. London, Bell, 1960. 21s net

Wing Commander Macmillan has chosen an interesting way of presenting aviation history, directly analogous to revealing a period by writing a series of biographical sketches of those who were typical of it, or who were outstanding in it. He has offered

the reader 'a story of the unfolding development of aviation, seen through the practical medium of ten contributing aircraft. The aircraft themselves are its heroes.' The machines are the Wright *Flyer* of 1903, the *Camel*, *Vimy*, *Pixie*, *Fox*, *Spitfire*, *Superfortress*, *Canberra*, *Viscount*, and *Comet*.

I find it an almost impossible book to review, as it is a matter of purely personal opinion as to which the great aircraft are (apart from universal agreement about the Wright *Flyer* and the *Spitfire* and perhaps the *Viscount*). But having accepted the author's terms of reference, so to speak, one can only praise the result. For Macmillan has the splendid knack—I use the word without any slight—of giving us both the personal and technical background of an aircraft, and all of it written in fine straight English. He is a practical airman himself, and this gives the accounts an even more authoritative note. The aeroplanes in question emerge as living creations of living men, and are described, as they should be, as people. Not the least of the attractions of this book are the full technical specifications and performance figures, written into the story in the most natural way, and playing their essential part in it.

It is rather peculiar (to be carping) to find one machine—the Boeing *Superfortress*—taking up no less than 75 of the pages, no matter how important it can be rated in history, and one feels the author has allowed himself to run away with it, or it with him. There are, of course, far too few types in the book in any case. But to compensate us, there is one of the very best accounts ever given of the Wright No. 1 *Flyer* of 1903 (it was called *Flyer*, by the way, after the name they gave their cycles), and of the wicked plot by Curtiss to discredit the Wrights by trying to make the Langley 'aerodrome' fly.

In closing, I should like to suggest that, despite Macmillan's personal belief in what were great aircraft and what were not, it would be possible to arrive at a number of generally agreed machines numbering some fifty or so; and he would be the ideal writer to immortalize these aircraft in what would become a classic work of aeronautical history.

C. H. GIBBS-SMITH

SICKERT. By Lillian Browse. London, Hart-Davis, 1960. 63s net

Last year's commemorative exhibitions at the Tate Gallery and elsewhere, celebrating the centenary of Walter Richard Sickert, confirmed his position with little dissent as the greatest painter England has produced since Constable and Turner. Sickert's origin was actually Danish, and indeed his roots and formative sympathies were as European as those of his old master Whistler, whose American origin has similarly never deprived him of full association with the English school. Miss Browse's new book, superseding her earlier study with an entirely fresh introduction and illustrations, contains no passage more absorbing than the account of young Sickert's mission to Paris for Whistler in 1883, and the pupil's meeting with Degas which was to prove a turning-point in Sickert's attitude to his art.

The mission, in fact, was to take charge of the conveyance of Whistler's celebrated portrait of his mother which was to be shown at the Salon. Sickert crossed by Dieppe. 'I have a clear recollection', he wrote 'of the vision of the little deal case swinging from a crane against the star-lit night and the sleeping houses of the Pollet de Dieppe. Whistler had given me letters to Degas and Manet, and copies of the famous brown-paper catalogue of his etchings to present to them, and I was to say to them that Whistler was amazing.' Sickert stayed at the Hôtel du Quai Voltaire as Oscar Wilde's guest. Too late to see the dying Manet, he sought out Degas, whose patronizing chaff gave place in time to as much respect for his visitor as the sardonic old professional ever held for an English contemporary.

In Sickert's paintings of the next few years, such as *The Laundry Shop*, *Dieppe* and *A Singer at the Old Bedford*, Degas's influence begins to become apparent, whilst the fastidious handling and restricted tonality of Whistler are preserved. Sir

Herbert Read has somewhere remarked that it was Sickert's fate thereafter to remain in the great shadow of Degas all his days. But that, surely, is to undervalue not only the subtlest nuances of low and rich tonalities combined with an abounding zest for the variety of cheap lodging-house and music-hall life, but also to ignore those compositional and chromatic discoveries which Sickert continued to make, with every change of scene and impulse, into late maturity. Sickert's Venice is his own and no one else's; while in later years the ghostly drama of *The Raising of Lazarus* bespeaks a master product of the creative imagination.

Miss Browse writes acutely about the artist's successive phases, and knowledgeably about his methods and the circumstances of his better known paintings. Her failure is an inability to bring the man to life, to evoke the jaunty, debonair presence and the airy throw-away line. Sickert, indeed, was that rare being a dedicated artist who continually courted the risk of being taken for a clown. 'He was a *poseur* by choice; he was naughty by nature and he never ceased to be an actor', his friend Mr. Clive Bell has decided. And it is true that to Sickert, breakfasting at railway stations or keeping a taxi ticking at one of his front doors the best part of the day, the world was always a stage, and he the capricious and scintillating player.

But while every reader of his crackling essays must separate for himself Sickert's commonsense and flashes of insight from his frequent banter, all may agree on the vitality which quickens his art almost to the end. Around 1927 he embarked on a series of nostalgic *Echoes* which seem to Miss Browse to betray a pathetic falling-off. These free adaptations of prints and engravings after his old favourites, such as Cruikshank and Gilbert—transposed to a large scale—may not be among Sickert's major achievements, but they illumine his well-stored mind. What certainly never fell away were the abiding affection and loyalty of his friends. The staunchest of them, Sir Alec Martin, now his executor, raised a fund when Sickert's free-and-easy living had brought him into difficulties at the time of his final movement out of London to St. Peter's in Thanet. 'I am rather surprised not to feel more shame than I do at being caught guilty of some mismanagement', he confessed to Sir Alec. 'It is evident, however, that the friends whose names I have on your list confirm me in the opinion that they must all be convicted of a measure of approbation of my painting and teaching.' It was, in truth, the approbation of a genius whose fame has never faded, shining to-day as brightly as ever it did before he closed his door on us in 1942.

NEVILLE WALLIS

A VICTORIAN PUBLISHER. *A Study of the Bentley Papers*. By Royal A. Gettman. Cambridge, University Press, 1960. 40s net

Richard Bentley entered publishing in 1829 and began to operate independently three years later; he was succeeded by his son George in 1867; his grandson, also Richard, who played a comparatively negligible part in the business, sold it to Macmillan in 1898. The activities of the House of Bentley, embracing fiction, biography and memoirs, history, travel, and periodical publishing, thus marched with an age of steadily widening literacy, during which English publishers evolved from being the mere 'retailers' whom Scott affected to despise, to attain the status of professional men. Professor Gettman's book is not a continuous history of this family enterprise. He has used the abundant detail contained in the surviving business records and correspondence of the Bentleys to illustrate some of the main problems confronting them in this period. It is a skilfully organized and valuable study, not least for its aptness in reminding us of the fact that in 'Victorian times, it was generally the writer who spoke the last word and received the sympathy'.

One of the clearest demonstrations of this dictum is Richard Bentley's quarrel with Dickens. It did lasting harm to Bentley's reputation, as did, in a lesser degree, his later disputes with Charles Reade and W. H. Prescott—all lending colour, in the eyes of posterity, to the satirical portrait of him drawn by Thackeray in

Pendennis. In each instance, however, Professor Gettman's exposition of the negotiations which took place allows for faults of judgement on both sides and shows how the points at issue were symptomatic of a mistrust bred by the very nature of the relationship. Bentley's trouble was to persuade authors of his need to maintain a balance between sharing the profit and sharing the risk. The case of Dickens, 'risen like a rocket', exemplified in an acute form the perils of any attempt to set a precise, much less a 'fair', monetary value on a literary work. Artistic merit alone was not a serviceable criterion, as witness the losses incurred on novels by Herman Melville, Sheridan Le Fanu or George Gissing—to mention three of the most distinguished names on the Bentley list. Leaving aside unpredictably fast and steady sellers like *The Ingoldsby Legends* or *The Channings*, which Richard and George Bentley were seen (in retrospect) to have acquired cheaply, it does not appear that they drove hard bargains. Indeed, they frequently over-estimated the market value of new manuscripts, and bore numerous losses with composure. This impression of near-liberality is reinforced by the loyalty shown to the firm on the part of writers whose attitude to their work was more accommodating, such as Mrs. Gore, prolific and level-headed ('I was a reader of trash long before I became a writer of it'), or more significantly, the American, James Fenimore Cooper.

Both these writers were in the habit of selling their copyrights for a fixed sum, but Professor Gettman points out that this practice was 'neither so frequent nor so simple as is commonly supposed'. In their efforts to reduce the speculative element in publishing and at the same time to create future sources of income, the Bentleys used various forms of agreement. That based on a sliding scale of royalties was slow to develop, and there is no instance brought to light here of the firm undertaking to begin royalty payments on a book with the first copy sold. It would seem that Cassell's agreement with Stevenson in 1883 for the publication of *Treasure Island* is something of a landmark in this respect.

The rate of expenditure on advertising affords another interesting comparison with present-day practice. 'Keep my book at the head of your advertisement lists', Ouida once instructed Fisher Unwin, 'you have nothing to equal it.' The House of Bentley did not have to contend with such vanity: it was the highly competitive nature of their business, rather than pressure from authors, which drove them to lay out a wastefully high proportion of money in publicity. Professor Gettman illustrates the cost of advertising six novels chosen at random from the period 1857-90. In three cases (two of them involving Bentley in a gross loss) expenditure under this head amounted to more than thirty per cent of the receipts from the edition, which nevertheless did not sell out. If the probable cost of the publisher's overheads is added to his other liabilities on these six accounts, one wonders indeed, with the author of this study, 'how did the House of Bentley keep open its doors?'

In searching for the answer to this question, Professor Gettman is cautious of generalization. Though his pages are deliberately loaded with figures, these are never presented in such a way as to oversimplify the relationships they annotate. From the point of view of literary history, his study is perhaps most deeply interesting when he turns aside from the ledgers to consider other less easily calculable factors involved in a publisher's well-being: the advisability of attempts to cater for the diversity of public taste or to influence the subject matter of forthcoming books, the development of editorial policy and the part played therein by the firm's readers, or the exigencies of a popular format. The ultimate demise of Bentley is attributed to this last cause. The firm came to be closely identified with the three-volume novel selling at 31s 6d, a format and price which remained standard for three-quarters of a century. It has sometimes been thought that the natural life of the 'three-decker' was prolonged to suit the commercial circulating libraries; according to the Bentley correspondence, however, it was Mudie's Library, backed by Smith's, which was the first to find the novel in this form unprofitable, and to

insist that it should be abandoned. Richard Bentley II could not make the adjustment to new ways.

J. S. S.

NATURE: EARTH, PLANTS, ANIMALS. (*Macdonald Illustrated Library, Vol. II.*) Edited by James Fisher and Sir Julian Huxley, with Sir Gerald Barry and Dr. J. Bronowski. London, Macdonald, 1960. 45s net

We demand three qualities in a book of popular science: it should look inviting and readable; it should be reasonably accurate and distribute attention sensibly round the vast domain from which it selects material; it should be comprehensible to those to whom it is addressed and set comparable standards in its different parts. The first is much the most important and on that count this book deserves high praise. There is at least one picture or diagram on every pair of pages and they are either pleasantly exciting and evocative or really illustrate the point at issue. Editors often 'illustrate' one's articles with photographs chosen more or less at random from a picture library, but these pictures have been carefully chosen or specially drawn so that the essentials stand out clearly. They are an intellectual as well as a visual treat.

The selection of material is reasonable. After 14 pages on astronomy and meteorology we get 30 on the structure and form of Earth and the forces that have shaped and are still shaping it. Then biology begins. Biochemistry and physiology get 60 pages and evolution another 60. Animal behaviour, competition and distribution get 80 pages, and the history of Man, his communities and the growth of knowledge, 30. Every reviewer would vary the ratios slightly. I would have had more on agriculture and less on primitive magic and art; but that is a matter of personal whim.

On two counts therefore the book comes out well. It is less satisfactory on the third, and this is largely the fault of the editors, for they seem to have exercised little general supervision. Parts, the section on life in a desert for example, are written for rather backward children; other parts are nearly incomprehensible because of content, style or carelessness. For example, the piece on isostasy will not be very illuminating to a reader who does not know enough about the subject already to realize that the floating block of wood, discussed as an example, must be wider than it is deep so that it will not turn over, and that the cuts made in it, to show the different levels at which it floats, must be made parallel to the water surface. The editors have also not resolved contradictions; thus, on one page we are told that seeds have germinated after 100 to 150 years' storage and, 35 pages later, after 1,000 years. In a popular book it is wise to keep the flock in line! Similarly it is good to tell people that the Silurian is named after the Silurii and that Paleozoic means ancient life, but it is equally important to tell them about the Ordovician and to explain Oligocene, Pliocene and so on. It is only when these things have been explained that the names can be remembered, and consistency has its advantages.

These faults may be trivial but they are irritating in what is otherwise an excellent book. Two other faults are more serious. Purpose and teleology have managed to intrude themselves here and there—presumably when the editors were not looking. The only polite comment to make on the phrase 'The lovely shapes, colors and scents of flowers are intended to attract insects and ensure pollination' is 'Intended by whom?' And the 24 pages of Appendix on classification have some helpful pictures of representative members of the various orders of plants and animals, but the text is so heavy and intimidating that it will not be very enlightening to the sort of reader that the rest of the book will attract.

N. W. PIRIE

FROM THE JOURNAL OF 1861

VOLUME VIII 29th March

THE SOCIETY'S 13TH ANNUAL EXHIBITION OF INVENTIONS



80. *The Occhiombra or Patent Transparent Ventilating Eye-Shade*; J. Calkin, 12 Oakley-square, N.W. Exhibited by Weiss and Son, 62 Strand, W.C.

The Occhiombra is constructed to exclude wind-dust, and excessive light. It consists of a light wire frame, part of which resting on the nose passes close to the face beneath the eye, passing upwards to the temples—the other part of the frame presents the usual appearance of an eye-shade, but is more symmetrical in its outline. A lengthened portion of the upper part of the frame passing round the forehead, is double, leaving an opening between the two portions for the free escape of heat generated by violent exercise. The whole is covered with gauze or other material—either single, double, or treble, to meet

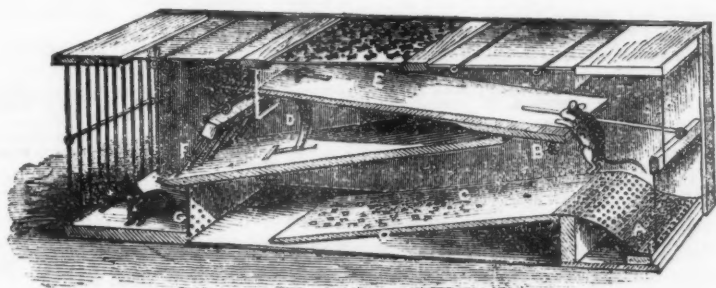


151. *Domestic Fire Escape*; J. T. Pedder, 85 Murray-street, New North-road, Hoxton, N.

The apparatus consists of an iron hinge bracket which is tightly fixed into the wall of one of the upper rooms in the house at the top of the window. When out of use it is turned back against the wall inside the room, the rope being kept in a box made in the floor. When wanted for use the arm is swung out at the top of the window; the rope is then hooked on the chain. The steadying rope at the bottom of the chair is then to be passed into the street, for a bystander to gently draw the chair in its descent out of reach of the fire for any person to get out of it when it reaches the ground. The felt curtains are then lifted up at the side facing the room, and the person gets in and is lowered by the

in the latter cases the requirements of those suffering from any affection of the eyes, and in the former the mere desire of protection from wind, dust and sun. The whole forms a closed chamber, admitting the free use of spectacles; the shade fits the head by its own elasticity, and is placed and removed with perfect ease—its weight is half an ounce. It is intended for travellers by railroad, and those who visit the sea-side.

rope which passes through the arm over the pulleys by any person in the room, or by passing the rope into the chair, and slipping it under the hook in the bottom, they can lower themselves, or by passing it into the street they can be lowered by the bystanders.



186. *Colin Pullinger's Registered Automaton Mouse Trap*; S. and E. Ransome and Co. 31 Essex-street, Strand, W.C.

The peculiar feature of this trap is that it is reset by every mouse caught in it. The engraving represents a perspective view of the apparatus, the side being removed to exhibit the construction of the interior. A is a box covered with perforated zinc, and which contains seed. The mouse is supposed to smell this seed, but as he cannot get it, he endeavours to reach the bait B, which is a wire cylinder filled with lard. In doing so, he must step on the tread C, and his weight overbalancing it, releases the trigger D from the catch, which throws the trap, and the mouse is caught as represented in the engraving. As there is no escape at the entrance, the mouse climbs upon the balance board E, and being attracted to the opposite end by the zinc grating at the top, the balance board descends by his weight, which raises the door, connects the trigger D to the catch, and the trap is re-set. The animal, finding the opening through which it got on the balance board again closed, pushes its way to the chamber G, through the wire door F, which falls when he has passed, and finally secures him.

Some Activities of Other Societies and Organizations

MEETINGS

WED. 1 MAR. Engineers, Junior Institution of, at the James Watt Memorial Institute, Gt. Charles Street, Birmingham. E. S. Sellers: *The development engineer in the petroleum industry.*

Kinematograph Society, British, at Central Office of Information, Hercules Road, S.E.1. 7.30 p.m. P. H. Treadgold: *The design of new television studios.*

Royal United Service Institution, Whitehall, S.W.1. 3 p.m. R. H. S. Crossman: *Western defence in the 1960s.*

Victoria & Albert Museum, South Kensington, S.W.1. 6.15 p.m. Basil Taylor: *George Stubbs in the 1760s.*

THURS. 2 MAR. Electrical Engineers, Institution of, Savoy Place, W.C.2. 5.30 p.m. N. N. Hancock and P. L. Taylor: *The place of formal study in the post-graduate training of an electrical engineer.*

Royal Commonwealth Society, Northumberland Avenue, W.C.2. 1.15 p.m. Major Czeslaw Jesman: *The background to the Congo.*

Royal Institution, 21 Albemarle Street, W.1. A. K. Parker: *The function of a university press.*

FRI. 3 MAR. Analytical Chemistry, Society for, at Royal Society, Burlington House, W.1. 2.45 p.m. R. C. Chirnside: *The enlargement of horizons in analytical chemistry.*

Engineers, Junior Institution of, Pepys House, 14 Rochester Row, S.W.1. Film: *The Kariba hydro-electric scheme.*

Royal Institution, 21 Albemarle Street, W.1. Sir Lawrence Bragg: *The development of X-ray analysis.*

MON. 6 MAR. Commonwealth Institute, S.W.7. 5.45 p.m. E. C. Wheatley: *A Commonwealth tour by motor scooter.*

Engineers, Society of, at The Geological Society, Burlington House, W.1. 5.30 p.m. H. Kaylor: *Some aspects of pre-stressed concrete.*

Royal Geographical Society, 1 Kensington Gore, S.W.7. 5 p.m. Stanislaw Leszczycki: *The economic regions of Poland.*

TUES. 7 MAR. Electrical Engineers, Institution of, Savoy Place, W.C.2. 5.30 p.m. A. V. Hemingway and R. L. Dressler: *The automatic control of machines for assembling mechanical components.*

Reinforced Concrete Association, at Birmingham and Midland Institute, Paradise Street, Birmingham. 6 p.m. E. W. H. Gifford: *Pre-stressed concrete bridges.*

WED. 8 MAR. Kinematograph Society, British, at Shell-Mex House, Strand, W.C.2. C. Challis: *The photographic problems encountered in filming the feature 'Sink the Bismarck'.*

THURS. 9 MAR. Chemical Society, at the College of Science and Technology, Manchester. *Some problems in the chemistry of phosphorus.*

Royal Commonwealth Society, Northumberland Avenue, W.C.2. 1.15 p.m. Le Roux Smith Le Roux: *Encouraging art in the Commonwealth.*

University College, London, Gower Street, W.C.1. 5.30 p.m. Dr. L. D. Ettlinger: *Art history to-day.*

FRI. 10 MAR. Chemical Society, at The University, Birmingham. 4.30 p.m. Professor G. Porter: *Very fast chemical reactions.*

Engineers, Junior Institution of, Pepys House, 14 Rochester Row, S.W.1. J. F. Pownall: *The grand contour canal as a national water grid.*

Royal Institution, 21 Albemarle Street, W.1. Dr. Ronald King: *Energy.*

MON. 13 MAR. Commonwealth Institute, S.W.7. 5.45 p.m. Dr. Kelfa-Caulker: *Sierra Leone attains independence.*

Electrical Engineers, Institution of, Savoy Place, W.C.2. 5.30 p.m. Discussion: *Town planning and electrical requirements.*

Royal Geographical Society, 1 Kensington Gore, S.W.7. 6 p.m. Film: *The Borneo story.*

THURS. 16 MAR. Chemical Society, Burlington House, W.1. 7.30 p.m. Professor A. N. Terenin: *Charge transfer in organic solids, induced by light.*

Royal Commonwealth Society, Northumberland Avenue, W.C.2. 1.15 p.m. O. V. Garratt: *Prison administration—its principles and practice.*

FRI. 17 MAR. Royal Institution, 21 Albemarle Street, W.1. Dr. R. S. Nyholm: *Magnetism and chemical architecture.*

TUES. 21 MAR. Civil Engineers, Institution of, Great George Street, S.W.1. 5.30 p.m. J. M. Bruckshaw, J. Goguel, H. J. B. Harding and R. Malcor: *The work of the channel tunnel study group.*

WED. 22 MAR. Radio Engineers, British Institution of, at London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1. 5.30 p.m. Discussion: *The future of high speed storage systems.*

Royal United Service Institution, Whitehall, S.W.1. 3 p.m. Professor P. M. S. Blackett: *Comments on the nuclear controversy.*

THURS. 23 MAR. Civil Engineers, Institution of, Great George Street, S.W.1. 5.30 p.m. Informal discussion: *Traffic engineering study group.*

Royal Commonwealth Society, Northumberland Avenue, W.C.2. 1.15 p.m. George Murray: *The press.*

OTHER ACTIVITIES

NOW UNTIL SAT. 8 APR. Design Centre, 28 Haymarket, S.W.1. Exhibition: *Weekend living. Furnishing ideas for a country cottage.*

MON. 6 MAR.-THURS. 9 MAR. Oil and Colour Chemists' Association, at Royal Horticultural Society's Old and New Halls, Vincent Square, S.W.1. *Thirteenth technical exhibition 1961.*

MON. 6 MAR. (For a week) Commonwealth Institute, S.W.7. Films: *Tasmania to-day and Himalayan tapestry.*

MON. 20 MAR. (For a week) Commonwealth Institute, S.W.7. Films: *Shyway south—New Zealand and This is Bermuda.*

